The Split Intransitivity Hierarchy in Second Language Acquisition of English:An Experimental Investigation

Doctoral Dissertation

The Split Intransitivity Hierarchy in Second Language Acquisition of English: An Experimental Investigation

（第二言語としての英語習得における自動詞階層--実証研究--）

Wu Lili

2020

Acknowledgments

It is my great pleasure to acknowledge those people who have provided me support and encouragement in the process of writing this dissertation. Without their help, this dissertation would not have been possible.

First and foremost, I would like to express my sincere gratitude to my supervisor, Professor Naoyuki Ono, who has helped me with his consistent support, kind encouragement, and constant guidance throughout this study. Whenever I feel upset and confused, he always encourages me to stay positive and trust myself. His encouragement and trust have helped me overcome many difficulties at the different stages of my research.

I am also deeply grateful to my sub-supervisor Professor Daiko Takahashi for his dedicated support and careful guidance. He has spent time reading my dissertation and giving me valuable comments and advice. I have benefited a lot working as his TA for the syntax course, and it was him who first inspired my interest in the study of generative syntax with wonderful lectures in his class.

My appreciation also goes to Professor Takeshi Nakamoto, who is the member of the dissertation committee, for his effort in reading my dissertation and giving me valuable feedback for improvement. My gratitude is also due to Professor Mariko Nakayama, who has helped me with her patience and kindness. She has generously provided me enlightening suggestions and insightful comments on the research design and data analysis of my dissertation. My gratitude also goes to Professor Ryan Spring, who has helped me in data collection and data analysis.

I would also like to thank all my friends, professors, and faculty members of the department of language sciences, Graduate School of International Cultural Studies at Tohoku University. Thanks go to all of them, and I am sorry that I cannot thank them all by name here.

Finally, I wish to thank my family, including my parents and my parents-in-law, for being so understanding and supportive in the past three years. I would also like to express my deepest love and thanks to my husband and my son, who have constantly reminded me the meaning of life.

Table of Contents

List of Abbreviations

ALTE	Association of Language Testers in Europe
ASH	Auxiliary Selection Hierarchy
ASP	aspect
CL	classifier
D-structure	deep structure
DUR	durative
GB	Government and Binding
L1	first/native language
L2	second/non-native language
NOM	nominalization particle (*de*)/nominative case (*ga*)
NP	noun phrase
NQ	numeral quantifier
PP	prepositional phrase
PPPs	prenominal past participles
PERF	perfective
QPT	Quick Placement Test
SV	subject-verb
SIH	split intransitivity hierarchy
TP	tense phrase
UA	unaccusative
UE	unergative
UTAH	Uniformity of Theta Assignment Hypothesis
UG	Universal Grammar
V	verb
VP	verb phrase
VS	verb-subject

List of Tables

List of Figures

Chapter 1 Introduction

1.1 Research Background

1.1.1 Universal Grammar and Language Acquisition

Native language (L1) acquisition differs greatly from non-native language (L2) acquisition. It is widely assumed that native speakers' grammars are constrained by Universal Grammar (UG), a biologically endowed language faculty (Chomsky, 1981; Pinker, 1984, 1994). UG allows the L1 acquirer to arrive at a grammar based on the primary linguistic data he/she is exposed to. UG provides a genetic blueprint and an inventory of possible grammatical categories and features in the broadest sense (White, 2003). UG constrains L1 acquisition and the knowledge of adult native-speakers, which suggests that the grammars of children and adults both conform to the principles of UG.

UG is motivated on the ground of learnability arguments, which means that the subtle and abstract knowledge acquired by young children goes beyond the linguistic input they are exposed to (Schwartz & Sprouse, 2000a, 2000b, 2013). In other words, there is a mismatch between the linguistic data L1 acquirers are exposed to and the unconscious knowledge attained by them. This mismatch leads to the so-called logical problem of language acquisition or the problem of the poverty of stimulus. Given that the knowledge attained by L1 acquirers is left unaccounted for, therefore, "UG is proposed as an explanation of how it is that language acquirers come to know, unconsciously, properties of grammar that go beyond the input in various aspects" (White, 2003, p. 4).

While it is assumed that UG constrains children's L1 acquisition so that children tend to

acquire their L1 with relative ease and rapidity, it is hotly debated whether there is still an access to UG in L2 acquisition (Rothman & Slabakova, 2018; White, 2003). The question of whether UG constrains non-native grammars, also referred to as interlanguage grammars, has been investigated and much debated since the early 1980s (White, 1989). Different hypotheses have been proposed to describe the nature of interlanguage grammars. The Fundamental Difference Hypothesis, representing the no access position (for example, by Cook & Newson, 1996), claims that child L1 and adult L2 acquisition are fundamentally different in major respects (Bley-Vroman, 1990, 2009). It suggests that L2 learners do not have direct access to UG, and UG does not constrain interlanguage grammars. The Full Transfer/Full Access Hypothesis, on the other hand, proposes that the entire L1 grammar constitutes the initial state of L2 acquisition (Schwartz & Spouse, 1994, 1996). It indicates that when the L1 grammar cannot accommodate the L2 input, L2 learners would resort to UG options not instantiated in their L1. Thus, the resulting interlanguage grammars are UG-constrained, and interlanguage grammars should be "restricted to properties found in the L1 and/or L2, and/or natural languages in general" (White, 2003, p. 43).

Previous L2 acquisition studies have found that there are undoubtedly many variables that are influential in interlanguage development, and they endeavor to provide an understanding of the interplay " between knowledge that comes from the knowledge pertaining to all human languages (UG), knowledge that comes from the mother tongue (henceforth L1 transfer), and knowledge that comes from exposure to the target language" (Rothman & Slabakova, 2018, p.419). A good case to investigate if UG constrains interlanguage grammars in L2 acquisition is to find out if L2 learners are also faced with a logical problem of acquisition, or a learnability

problem, parallel to the situation in L1 acquisition. The claim that UG continues to be accessible in L2 acquisition is based on the learnability problem that some knowledge that is present in L2 interlanguage grammars but could not be acquired on L2 input, L1 transfer nor explicit teaching. In the L2 acquisition contexts, acquiring English intransitive verbs represents a classic learnability problem (Juffs, 2001; Montrul, 2004).

1.1.2 Split Intransitivity

The split of intransitive verbs into unaccusatives (UAs) and unergatives (UEs) is referred to as split intransitivity. The most widely accepted analysis of split intransitivity is the Unaccusative Hypothesis. It was first proposed by Perlmutter (1978) in the framework of Relational Grammar, and was later adopted by Burzio (1986) in the Government-Binding (GB) framework (Chomsky, 1981). The essential claim of the Unaccusative Hypothesis is that in all languages, intransitive verbs can be identified as either UAs or UEs based on their different syntactic and semantic properties. Examples of a UA verb and a UE verb are presented in (1a) and (1b), respectively.

(1) a. Mary arrived. (UAs)
b. Mary worked. (UEs)

Although the two sentences look alike superficially, they are different in several aspects. They are assumed to have different underlying syntactic structures. For example, from the GB perspective, a UA verb takes a deep (D-) structure object and no subject, while a UE verb takes a D-structure subject and no object. More specifically, though the noun phrase (NP) *Mary* in *Mary arrived* surfaces in the subject position, it is actually base-generated in the direct object

position like the object of a transitive verb. The subject of a UE verb, like *Mary* in *Mary worked*, is a true subject and it is base-generated in the subject position like the subject of a transitive verb. Alternatively, in terms of the argument structure, a UA verb is assumed to have an internal argument, whereas a UE verb has an external argument.

What's more, UAs and UEs are also assumed to bear different thematic roles. The argument of UAs typically bears a theme or patient theta role, while that of UEs bears an agent theta role. Thus, in terms of thematic roles, the argument of UAs can be grouped together with the object of transitives, both bearing the agent theta role. The argument of UEs can be grouped together with the subject of transitive verbs, both taking a theme theta role. It is usually the agent that is the initiator of the action that maps to the subject position, whereas it is the theme, which is the person or thing that is acted on, that maps onto the object position.

Although the UA-UE distinction has been claimed to be a universal phenomenon, different languages display different syntactic and morphological realization of split intransitivity. All intransitive verbs are either UAs or UEs, which can be identified through language-specific diagnostics of split intransitivity. According to Levin and Rappaport Hovav (1995), split intransitivity is syntactically encoded but semantically determined. In other words, the UA-UE distinction is systematically associated with certain semantic characteristics of the predicate. However, myriad empirical studies have repeatedly shown inconsistencies in the alignment between the syntactic and semantic properties of split intransitivity (Levin and R. Hovav, 1995; Borer, 2005). Thus, verbs with similar meanings in and across languages might be classified differently with respect to split intransitivity. The so-called "unaccusative mismatches" pose great challenges to the Unaccusative Hypothesis, a binary syntactic distinction that assumes a

relationship of predictability between the syntax and semantics of intransitive verbs.

Various hypotheses have been proposed to tackle the so-called 'unaccusative mismatches' and try to identify the syntactically relevant semantic properties of the verb (Bard et al., 2010). One of the lexicon-syntax approaches explored the observation that in languages that manifest split intransitivity, certain semantic verb classes exhibit the UA-UE distinction consistently and reliably, whereas others show variation in classification. Sorace (2000, 2004, 2011) proposes a gradient approach, the Split Intransitivity Hierarchy (SIH), drawing on a series of empirical studies on both L1 and L2 acquisition of auxiliary selecting languages. She argues that monadic intransitive verbs are modulated along a gradient by the aspectual feature of telicity of the verb as well as by the degree of agentivity of the verb. Sorace (2000) assumes that core verbs tend to be categorical and consistent in selecting BE and HAVE, whereas peripheral verbs are predicted to be variable. Much evidence for the core-peripheral distinction in split intransitivity has been found in a dozen topologically diverse languages (Bard et al, 2010; Laws & Yuan, 2010; Montrul, 2004; Sorace, 1993, 1995; Vernice & Sorace, 2018). The SIH is, therefore, considered to be a potentially universal hierarchy of split intransitivity that may apply to many other syntactic diagnostics of unaccusativity in languages with or without auxiliary selection (Sorace, 2004).

1.1.3 Research Gaps

Previous studies on the L2 acquisition of split intransitivity demonstrate that learners of languages (such as English, Chinese and Japanese) in which split intransitivity is not overtly or unambiguously marked in the input are also aware of the UA-UE distinction (Balcom, 1997;

Hirakawa, 2001; Yuan, 1999). Previous studies also report that L2 learners often have difficulty in learning how the UA-UE distinction is manifested syntactically (Sorace & Shomura, 2001). Although the UA-UE distinction is universal, different languages encode the distinction in language-specific diagnostics (or configurations). For L2 learners, they have to discover the cross-linguistic variations in how languages encode the UA-UE distinction morphologically and syntactically. Researchers suggest that L2 learners would rely on semantic evidence in such a situation (Sorace & Shomura, 2001; Montrul, 2001). That is, the lexical semantic features of particular verbs facilitate their classification as either UAs or UEs.

Sorace (1993a, 1993b, 1995, 1996) investigates the influence of lexical-semantic properties on the acquisition of the syntax of split intransitivity in Italian and French. She finds that two of the main syntactic diagnostics of the UA-UE distinction—auxiliary selection and *ne*-cliticization are lexically constrained by the SIH and tend to be acquired in a gradient manner, suggesting that learners would resort to semantic evidence in the process of acquiring the distinction. She also suggests that the syntactic distinction is relatively easier to acquire in languages like Italian, which presents a consistent and clear-cut cue for the UA-UE distinction, than those languages such as French, which offers less consistent and more ambiguous cues for the distinction.

Sorace and Shomura (2001) also provide evidence for the core-peripheral distinction when investigating the acquisition of quantifier floating, a diagnostic of Japanese split intransitivity, by English-speaking L2 learners of Japanese. They demonstrate that English-speaking L2 learners of Japanese follow a developmental pattern as predicted by the SIH, i.e. core-verbs first, followed by peripheral ones. Given the fact that Japanese does not have overt and

consistent morphosyntactic markers for the UA-UE distinction, Sorace and Shomura (2001) suggest that L2 learners might resort more to semantic evidence when acquiring it in their L2.

Compared with Romance and other Germanic languages with auxiliary selection, English is a language without auxiliary selection. Instead, English presents many other syntactic diagnostics for split intransitivity. Although Baker (2018) suggests that the SIH is also plausible to capture the gradience of English split intransitivity, there is a lack of studies to investigate if it is possible for Mandarin-speaking learners, whose L1 does not have an overt morphological marker for the UA-UE distinction, to acquire the subtle properties of the core-peripheral distinction at the lexicon-syntax interface.

Furthermore, previous studies on the role of the SIH in predicting the overpassivization tendency of intransitive verbs remain divided and even conflicting. It has been observed that there are many factors influencing L2 learners' tendency to overpassivize intransitive verbs, including syntactic (The Postverbal NP Movement Hypothesis and the Transitivization Hypothesis), semantic (animacy, telicity), and discourse factors (causation types). The Postverbal NP Movement Hypothesis proposes that L2 learners treat UAs like passives, so they mark the NP movement of UAs with an overt passive morphology. The Transitivization Hypothesis, on the other hand, suggests that L2 learners treat UAs as transitives, adding objects to them. One of the limitations of the syntactic accounts is that they cannot account for the fact that not all UAs are equally overpassivized, and that different rates of error production were observed on apparently similar UAs. It is suggested that overpassivization is not triggered solely by syntactic movement. There must be other factors that affect the tendency to overpassivize intransitive verbs.

Ju (2000) first investigates whether conceptualizable agents in the discourse play a role in English overpassivization errors. Assuming that the availability of conceptualizable agents or external causers is evoked by the meaning of the verb and causation types (whether the event is externally or internally caused), she examines if Chinese L2 learners of English are more likely to make overpassivization errors with UAs in externally caused events (in which an agent or an external causer may be represented in learners' mental grammar) than in internally caused events (in which the cause or causer of the event is not clear). She also examines if L2 learners would make more errors with alternating UAs than with non-alternating UAs because the former is claimed to be more externally caused than the latter. The results, based on 13 alternating UAs and 5 non-alternating UAs, confirmed the first hypothesis but not the second. By recruiting four groups of different proficiency and testing an equal number of alternating and non-alternating UAs (six for each), Chung (2014) confirms both hypotheses, suggesting that the availability of agents, which are determined by both the verb meaning and causation types, affects the overpassivization tendency of UAs. In addition, Chung (2014) also examines the role of animacy (a semantic property of the subject argument) in L2 acquisition of passive UAs. She finds that Chinese and Korean L2 learners tend to passivize UAs with inanimate subjects more frequently than UAs with animate subjects. Animacy types affect the overpassivization tendency of UAs.

Some other studies investigate the effect of the SIH (telicity in particular) in L2 acquisition of passive UAs and examines if overpassivization of intransitive verbs of Japanese-speaking L2 learners is constrained by the SIH, but the results of the studies remain divided and even conflicting (Hirakawa, 2006; Yusa, 2003). Yusa (2003) argues that Japanese L2 learners of

English made more overpassivization errors with telic core UAs than with atelic non-core ones, while Hirakawa (2006) claims that there are no significant differences between telic core UAs and atelic non-core ones. One possible reason for the conflicting results is due to the task design in which the priming sentences and the subjects of target sentences are not controlled for causation types and animacy types. Therefore, it is of necessity to examine if L2 learner's tendency to over-passivize intransitive verbs are subject to the SIH with causation types and the animacy of verb argument controlled in the experiment.

1.2 Purposes of the Study

First, this paper addresses to what extent the core-peripheral distinction for split intransitivity is cross-linguistically consistent and to what degree direct access to an aspectual and thematic hierarchy at the syntax-lexicon interface is possible, given the fact that Mandarin, like English, does not have an overt and consistent morphosyntactic marker for split intransitivity. Specifically, the present study investigates whether native English speakers and Mandarin-speaking L2 learners are not only sensitive to the UA-UE distinction but also to the lexical constraints underlying the core-peripheral distinction by testing their judgments on core and peripheral verbs in the two diagnostics of split intransitivity: prenominal past participles (PPPs) and the *for hours* constructions (Alexiadou et al., 2004, p. 5; Schoorlemmer, 2004, p. 227).

Second, the present study examines if the tendency of overpassivization of intransitive verbs is subject to the prediction by the SIH. Previous studies like Yusa (2003) and Hirakawa (2006) made different claims about the role of the SIH effect because their studies did not

control the causation types and animacy types. The present study will investigate if core UAs are more likely to be passivized than peripheral ones with the two variables of causation types and animacy types controlled. On the assumption that the argument of UEs is an agent, and agents are typically animate entities (Bock and Warren, 1985; Dowty, 1991), the present study also explores if the animacy of the verbs' argument influences core UEs (denoting highly agentive events) to a greater extent than peripheral UEs (less agentive) and UAs (non-agentive).

Finally, this study also investigates the nature of interlanguage grammars. If interlanguage grammars are UG-constrained, it would be expected that UAs are represented differently from UEs, and core verbs are also represented differently from peripheral ones.

1.3 Research Questions and Hypotheses

Considering the purposes of the study, the present study aims to delve into the following two research questions.

Research Question 1

Do Mandarin-speaking L2 learners of English rely on semantic evidence in acquiring the syntax of split intransitivity?

Hypothesis I

Mandarin-speaking L2 learners of English would rely on the lexical properties of verbs in acquiring the UA-UE distinction. They will be not only sensitive to the UA-UE distinction but also to the core-peripheral distinction. To be more specific, L2 learners know that these two types of intransitive verbs have different argument structures. They

might also have difficulties in acquiring the two diagnostics of split intransitivity—PPPs and the *for hours* construction because their Mandarin counterparts allow both UAs and UEs. They would rely on semantic evidence in such situation to acquire the UA-UE distinction, starting with core verbs and gradually spreading to peripheral ones.

Research Question 2

Do telicity and animacy play a role in influencing Mandarin-speaking L2 learners' tendency to overpassivize intransitive verbs?

Hypothesis II

Given the fact that the availability of agents (the existence of an external causer in a context) is evoked by the meaning of verbs and causation types, it could be predicted that it is easier to conceptualize an agent for core verbs that denote telic change than non-core UAs that are atelic and non-agentive. It is also easier to conceptualize an agent for UAs in externally caused events than in internally caused events. Therefore, it is hypothesized that core verbs might be more likely to be passivized than non-core ones in externally caused contexts. On the other hand, agentivity is a primary feature of UEs, with core verbs being more agentive than peripheral ones. Agentive arguments tend to be animate. It could be predicted that the animacy of the verbal argument should affect core UEs to a greater extent than peripheral ones. It could also be predicted that the animacy of the verbal argument should affect UEs more strongly than UAs since UAs typically require a non-agentive (theme) argument, whereas UEs involve an agentive (agent) argument.

1.4 Organization of the Dissertation

This dissertation consists of 5 chapters. Chapter 1 briefly introduces the research background and purposes of the study. It then presents the research questions and hypotheses that are to be answered and tested in Chapter 3 and Chapter 4. The chapter ends with a general outline for the dissertation.

Chapter 2 explains the two theoretical approaches to split intransitivity including the Unaccusative Hypothesis and the SIH. It also presents two syntactic diagnostics for English split intransitivity that are tested in the present study, and their Mandarin counterparts are briefly discussed as well. Previous studies on the core-peripheral distinction and different accounts for overpassivization of intransitive verbs are reviewed in detail and the unresolved problems are thus pointed out.

Chapter 3 presents the methodology and results of the first experiment aiming to examine the lexical constraints on L2 acquisition of English split intransitivity syntax. Native speakers as well as L2 participants will be tested on the two diagnostics of split intransitivity—PPPs and the *for hours* constructions in the experiment. The data on their judgments are reported and analyzed in detail. The results in relation to the research questions are presented and explanations of what this data means for L2 acquisition of split intransitivity are discussed at last.

Chapter 4 describes the second experiment aiming to investigate telicity and animacy effects on the overpassivization tendency of intransitive verbs. It first reports the methodology including the tasks used in the experiment and the design of the experiment. Then it reports the data collected from the experiment and the results concerning the research questions. Finally, it

gives an analysis of the results and addresses the hypotheses proposed in the beginning.

Chapter 5 is a concluding part in which the overall results of this study as they relate to the purposes and hypotheses of this dissertation are summarized, and theoretical and pedagogical implications are suggested. It also presents the limitations of the study and offers suggestions as to how research on L2 acquisition of split intransitivity can be improved upon and continued in the future.

Chapter 2 Review of Related Literature

Section 2.1 briefly reviews the theoretical analysis of split intransitivity and the challenges posed for the Unaccusative Hypothesis. Section 2.2 presents a gradient approach that explores the empirical challenge posed by the Unaccusative Hypothesis and its predictions for L2 acquisition. Section 2.3 summarizes previous studies offering evidence for the core-peripheral distinction in some typologically different languages as well as different accounts for overpassivization errors of intransitive verbs. Section 2.4 points out the unresolved problems and the issues that are going to be tackled in the dissertation.

2.1 The Unaccusative Hypothesis

As discussed in Section 1.2, although UAs and UEs look alike identically, they have different underlying arguments at the level of D-structure (Perlmutter, 1978; Burzio, 1986). For UAs, the internal argument undergoes a NP movement from the VP-internal position to the specifier position of the tense phrase (TP) to receive Case in order not to violate the Case Filter, which states that all NPs must be marked with Case (Carnie, 2013; Chomsky, 1981). Burzio (1986) observed that there is a correlation between the ability of a verb to take an external argument and its ability to assign Case. According to Burzio's Generalization, "all and only the verbs that can assign a theta-role to the subject can assign (accusative) Case to an object" (Burzio,1986, p.178).

UAs and UEs are also assumed to bear different thematic roles. The argument of UAs typically is a theme or patient as in (2a), while that of UEs is an agent, as in (2b). Thus, in terms of thematic roles, the argument of UAs can be grouped together with the object of transitive

verbs, as in (2c), both being a theme. The argument of UEs, on the other hand, can be grouped together with the subject of transitive verbs, as in (2c), both being an agent. It is usually the agent that is the initiator of the action that maps to the subject position, whereas it is the theme, which is the person or thing that is acted on, that maps onto the object position.

(2) a. The window broke.

<theme>

b. John smiled.

<agent>

c. Mary broke the window.

<agent> <theme>

The systematic relation between the thematic roles and the syntactic positions where they are projected to is formulated as the Uniformity of Theta Assignment Hypothesis (UTAH) (Baker, 1988, p. 46).

(3) Uniformity of Theta Assignment Hypothesis

Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure.

It is assumed that the Unaccusative Hypothesis is motivated by the UTAH, a universal principle which links the argument structures and syntactic configurations in a systematic way (Hirakawa, 2003). The surface subject of a UA verb is a subject derived by NP movement, and it is an internal argument, typically bearing a theme theta role that is initially projected to the

direct object position, while the subject of a UE verb is a true subject, and it is an external argument, typically taking an agent theta role that is typically projected to the subject position.

The different syntactic configurations in various languages that are assumed to distinguish UAs from UEs are referred to as unaccusative diagnostics or diagnostics of split intransitivity. Although the UA-UE distinction is universal, different languages have different ways of encoding the distinction syntactically. Therefore, intransitive verbs can be identified as either UAs or UEs through language-specific diagnostics of split intransitivity. According to Levin and Rappaport Hovav (1995), split intransitivity is syntactically encoded but semantically determined. The UA-UE distinction is systematically associated with certain semantic characteristics of the predicate. For example, agentivity is often correlated with unergativity and patienthood with unaccusativity (Dowty, 1991; Perlmutter, 1978). However, the relationship between lexical semantic properties and syntactic expressions of split intransitivity is much more complicated than expected.

The Unaccusative Hypothesis is challenged empirically. Myriad empirical studies have repeatedly shown inconsistencies in the alignment between syntactic and semantic properties of split intransitivity (Borer 2005; Levin and Rappaport Hovav, 1995). The existence of "unaccusative mismatches", which refer to "cases in which there seems to be an imperfect match between the verbs expected to be selected on semantic or syntactic grounds as UAs or UEs by various diagnostics and the verbs actually selected by those diagnostics" (Levin & Rappaport Hovav, 1995, p. 4), indicates that it is quite difficult to fit many verbs unambiguously into one class or the other. For instance, agentive verbs of manner of motion, which are generally considered UEs, can be regarded as UAs in the presence of a directional phrase such

as (4a). Also, sound emission verbs often function unergatively and can appear in the resultative construction, which is assumed to be mainly compatible with UAs, as in (4b).

(4) a. He ran into the classroom.

b. The office door clicked open.

Similar mismatches can also be found in auxiliary-selection languages (Sorace, 2000). Across languages, some verb classes tend to be consistent in auxiliary selection, whereas others are not. Within languages, some verbs are categorical in selecting the same auxiliary regardless of context, while others exhibit variation in different contexts. For instance, some manner of motion verbs like *run* in Italian take either BE or HAVE, as in (5a), and only occur with BE when combined with a directional phrase, as in (5b). Examples are taken from Sorace (2000, p. 876).

(5) a. Maria ha corso/e corsa velocemente.

Maria has run/is run fast

b. Maria e corsa/*ha corso in farmacia.

Maria is run/*have run to the pharmacy

The theoretical challenge for the Unaccusative Hypothesis then is how to account for the variable behaviors of verbs based on the principle that the UA-UE distinction is syntactically manifested but semantically encoded. It is crucial to explain how lexical-semantic or aspectual properties underlying individual verbs are mapped onto the binary syntactic representations (Sorace, 2000, 2004, 2011). Different approaches have been proposed in the literature to

account for the “unaccusative mismatches” at the lexicon-syntax interface.

The projectionist approach mainly emphasizes the complex mappings between the level of lexical-semantic representation and the level of lexical-syntactic representation. The approach claims that the syntactically relevant semantic properties are first mapped onto the argument structure associated with unaccusativity or unergativity according to some linking principles. Then the lexical-syntactic representation is mapped trivially onto a syntactic structure representation. One of the most influential works of this type is Levin and Rapport Hovav’s model (1995). They propose four linking rules which map lexical semantic components of verb meaning underlying UAs and UEs onto positions at argument structure.

The first linking rule is ‘the Immediate Cause Linking Rule, which maps the argument of a verb denoting the immediate cause to the external argument’ (Levin & Rappaport Hovav, 1995, p. 135). This rule captures the generalization that internally caused verbs typically receive a UE status. Agentivity is subsumed under internal causation, since most UEs are agentive. The Immediate Cause Linking Rule also classifies non-agentive verbs such as *cough, shiver, tremble* as UEs because they are also internally caused. Verbs of emission, though classified as UAs by Perlmutter (1978), are maintained as basically UEs.

The second linking rule is ‘the Directed Change Linking Rule, which proposes that the argument of a verb that corresponds to the entity undergoing the directed change described by that verb is its direct internal argument’ (Levin & Rappaport Hovav, 1995, p. 146). This rule captures both verbs of change of state such as *break* and *open* and verbs of inherently directed motion such as *fall* and *come*. They distinguish verbs of agentive manner of motion like *walk* and *swim* from directed motion verbs like *come* and *go*. The former is UEs while the latter is

UAs.

The third rule is ‘the Existence Linking Rule, which maps the argument of a verb whose existence is asserted or denied onto the direct internal argument (Levin & Rappaport Hovav, 1995, p. 148). According to this rule, verbs of existence and appearance should be considered as UAs. Since the first three linking rules do not account for the behavior of all single-argument verbs, Levin and Rappaport Hovav (1995) put forward the fourth linking rule, the Default Linking Rule, which indicates that an argument of a verb that does not fall under the scope of any other linking rules is its direct internal argument.

To explain ‘unaccusative mismatches’, Levin and Rappaport Hovav (1995) assume that variable syntactic behaviors of certain verb classes are attributable to different lexical-semantic representations, each of which is mapped onto syntactic representations in a regular way. To summarize, Immediate Change, Directed Change and Existence are three important semantic properties to determine the mapping of the single argument as an external or internal argument. The external and internal argument, then, map onto the syntactic position of subject and direct object, respectively, distinguishing a verb either as UE or UA.

There are some problems with the projectionist approach on split intransitivity. First, the linking rules are language-specific instead of being language-universal. Secondly, the projectionist approach assumes that the variation is idiosyncratic and not rule-governed, but the cross-linguistic variations exhibited by the stative verbs indicate that variations are much more systematic and far from being exceptional. Finally, the projectionist approach cannot predict which verb classes are reliable and consistent in their mappings and which ones exhibit variations.

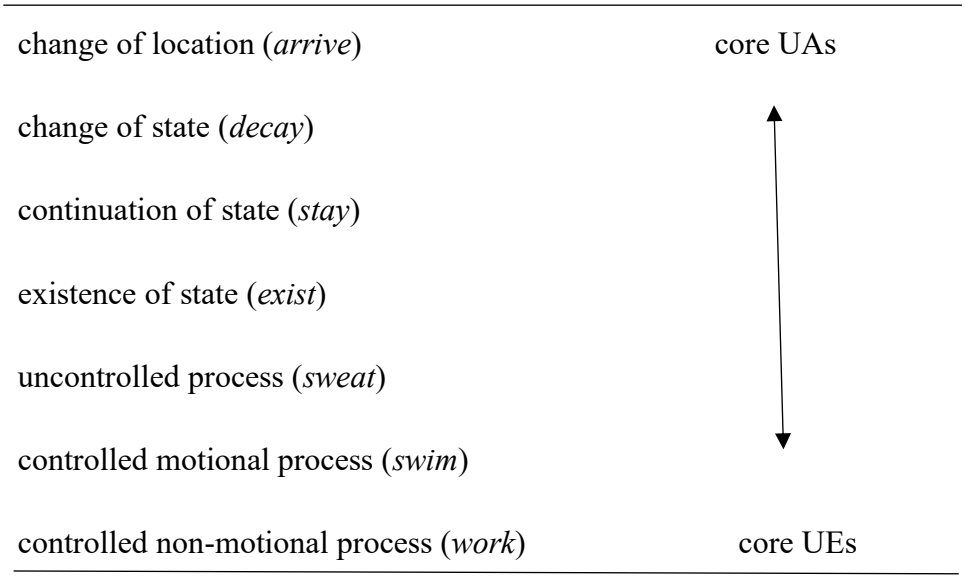
An alternative approach, namely the SIH, proposed by Sorace (2000, 2004, 2011), argues that there is a hierarchical organization of semantic classes within UA-UE verb classes which distinguishes between core and peripheral or non-core verbs. The hypothesis, also known as the gradient approach, aims to account for both the consistency and flexibility of different intransitive verbs in their syntactic behaviors. It is presented in the next section.

2.2 The Split Intransitivity Hierarchy

To capture the systematic differences in auxiliary selection, both cross-linguistically and language-internally, Sorace (2000) proposes an Auxiliary Selection Hierarchy (ASH) for monadic intransitive verbs to select the auxiliaries BE or HAVE. The ASH builds on the earlier observation (Baker, 1997; Grimshaw, 1990) that verbs denoting telic change and change-of state are associated with unaccusativity, and those denoting both agentive and unaffecting processes are associated with unergativity. It ranks verbs based on their lexical-semantic properties which distinguish core verbs from more peripheral ones. Core UA verbs at one end of the hierarchy are most consistent in selecting BE and core UEs at the other end are most consistent in selecting HAVE. Intermediate verbs are those in the middle that may be associated with either or both depending on the language. They are named “peripheral” or “non-core” because they exhibit variable behaviors in their choice of auxiliary not only within a language but also across languages (Sorace, 2000). To sum up, the choice of auxiliary selection is modulated in a gradient fashion by aspectual features (telicity/atelicity) of the verb and of the predicate in which the verb appears, as well as the degree of agentivity of the verb (Vernice & Sorace, 2018).

As the ASH is not only found in many auxiliary-selection languages, but also in other diagnostics of split intransitivity, such as quantifier floating in Japanese (Sorace & Shomura, 2001) and locative inversion in Mandarin (Laws & Yuan, 2010), Sorace (2004, 2011) argues that the ASH should be reclassified into the SIH because this model of gradience tends to be cross-linguistically universal as illustrated in Figure 2.1(adapted from Sorace, 2011, p. 69), regardless of whether or not the language exhibits such auxiliary selection.

Figure 2.1 The Split Intransitivity Hierarchy (SIH)



According to the SIH, intransitive verbs are organized in a hierarchy defined primarily by telicity and secondarily by degrees of agentivity. Telicity (goal-directedness) is the primary feature that can separate the UAs from the UEs, with "telic change" at the core of unaccusativity. Thus, verbs of change of location (e.g. *fall*) and change of state (e.g. *die*), are core UAs denoting telic change and therefore exhibit more consistent UA behaviors. Verbs of continuation of state such as *stay* and *remain*, as well as those of existence of state such as *sit* and *stand* are the least consistent in their UA behavior, for they denote neither change nor telicity. Agentivity is the

secondary feature that distinguishes core UEs from peripheral UEs, with "agentive atelic non motional activity" at the core of unergativity. Therefore, verbs of controlled non-motional process such as *play* and *work*, which are inherently agentive, are more consistent in their UE behavior than peripheral verbs of uncontrolled process such as *cough* and *sweat*. The core-peripheral distinction built on these two factors do not refer to gradients of unaccusativity/unergativity of verbs, because syntactic configurations of split intransitivity cannot have intermediate states. Instead, it refers to "their differential likelihood of allowing multiple syntactic behaviors" (Bard et al., 2010, p. 328). In short, the interaction of telicity and agentivity affects the syntax of split intransitivity and creates a gradient satisfaction of diagnostics for split intransitivity.

The SIH, in comparison with the projectionist approach, helps to account for both the consistency and flexibility of different intransitive verbs in their syntactic behaviors. The SIH also predicts that L2 acquisition of split intransitivity is lexically conditioned by the semantic properties of verbs. Core verbs are predicted not only to be categorical and consistent in syntactic behavior across languages and within individual languages, but also to elicit more determinacy of native speakers' intuitions and primacy in acquisition. Peripheral verbs, on the other hand, are subject to a degree of inconsistency and thus are delayed in acquisition (Keller and Sorace, 2003).

Drawing on the experimental data of native speakers of English on different diagnostics of English split intransitivity, Baker (2018) also claims that there is a good correlation found between the verb classes identified by the diagnostics of English split intransitivity and the SIH. Thus, the core-peripheral distinction in split intransitivity seems to be cross-linguistically

consistent in languages with or without auxiliary selection, but it remains unknown whether learners of an L2 without auxiliary selection, such as English, whose L1 also lacks such selection, such as Mandarin, will exhibit the same gradience in split intransitivity as native speakers. Therefore, looking at how L1 Mandarin learners acquire the syntax of English split intransitivity and whether or not they are lexically constrained by the SIH will help shed light on this issue. However, in order to test this, diagnostics of split intransitivity will be necessary because they are always taken as the syntactic manifestations that are sensitive to the semantic properties of the verb.

2.3 Syntactic Evidence for Split Intransitivity

Neither Mandarin nor English has obligatory and unambiguous morphosyntactic markers that distinguish UAs from UEs, but have optional syntactic manifestations of split intransitivity. For example, subjects of UAs and UEs can appear in a preverbal position in subject-verb (SV) order, while subjects of UAs can also appear in a postverbal position in the *There*-insertion construction. The only valid syntactic evidence of the UA-UE distinction in Mandarin is the locative inversion construction, in which the single argument of UAs can appear either preverbally or postverbally (Yuan, 1999; Laws & Yuan, 2010). In the present study, I only focus on two diagnostics that are sensitive to telicity, which is assumed to be the primary feature that distinguishes UAs from UEs. The detailed account of the two diagnostics in both languages are presented in what follows.

2.3.1 Prenominal Past Participles

In Prenominal Past Participles (PPPs) structures, participles are used as modifiers of nouns

which correspond to their initial (D-structure) objects. PPPs were purported as a diagnostic of split intransitivity first in Dutch (Hoekstra, 1984), and they have also been found to work in English (Levin & Rappaport Hovav, 1986), because this construction is allowed only by UAs and transitive verbs in English, as illustrated in (6) and (7).

(6) fallen leaves, frozen lakes, *worked man, *slept baby

(7) the newly built house, a well-served customer

In this construction, the participles of transitive verbs can be used to modify the nouns comparable to their direct object. UAs are also compatible with this construction since the modified nouns can be taken to correspond to the objects in D-structure, while UEs cannot be converted to such adjectival forms because the modified noun is a subject in D-structure. In summary, nouns that can be pre-modified by past participles are subjects of UA verbs or objects of transitive verbs.

In addition to the syntactic difference identified by PPPs, one semantic property, telicity, is also claimed to be decisive in the formation of PPPs. Most UA verbs that are found to be compatible with PPPs are telic verbs (Zaenen, 1993). Stative verbs, on the other hand, with no end-point, are not allowed in the formation, as illustrated by the unacceptability of *remained files* and *stayed problems*.

Thus, it seems that there is a good correlation between the SIH introduced above and the verbs compatible with the PPPs. First, verbs of change of location are classified as core verbs because of their inherent telicity. For example, telic verbs like *arrive* and *escape* can occur prenominally in expressions like *the recently arrived guests* and *an escaped prisoner*.

Furthermore, this construction is also possible with monadic verbs of change of state like *decay* and *appear*, which are also allowed in the construction such as in *the decayed building* and *a recently appeared novel*. It should be noted, however, that not all verbs denoting change of location and state are compatible with the construction. Some UA verbs denoting change of location and change of state like *arrive* and *appear* are more compatible with this construction if they are modified by adverbs like *newly* and *recently*, as mentioned in Baker (2018). However, though there is some variation, it does not invalidate the SIH because Sorace (2000) argues that not all verbs in the same class show the same behavior and that variability is governed by semantic regularities, particularly telicity. The class of verbs of change of state includes various verbs that encode telicity to variable degrees, and permission of a subset of change of state verbs in the construction holds up well for the whole verb class. Finally, because of the telicity restriction, peripheral verbs in the middle of the SIH and UE verbs are much more restricted in the construction as shown in (8). Thus, the different behaviors of core and peripheral verbs in PPPs provide evidence for the core-peripheral distinction in English split intransitivity.

(8) *the existed problem, *the sweated man, *the run man

Mandarin does not have participles, irrespective of past or present, to modify nouns, but verbs can modify a noun prenominally if they are attached to by *DE* (Fang Yuqing, 2008). Thus, Mandarin does not have an identical structure to English PPPs. The V-*DE* structure shares certain similarity with English PPPs, but the V-*DE* structure in Mandarin does not serve as a syntactic manifestation for the UA-UE distinction. Instead, both UAs and UEs are possible with the construction, as in (9a & b).

(9) a. lai de ren

arrive NOM man

"the man who has arrived/is arriving"

b. xiao de ren

smile NOM man

"the man who is smiling"

2.3.2. The *For Hours* Constructions

The aspectual notion of telicity has always been found to be relevant to the UA-UE distinction in several different languages (Dowty, 1991; van Hout, 2004; Van Valin, 1990). For example, Van Valin (1990) and van Hout (2004) stress the role of telicity in determining the status of a verb as either UA or UE in auxiliary selection of Dutch. Dowty (1991) also claims that the aspectual notion of telicity figures into predicting the class membership of intransitive verbs in English. The fundamental problem with these approaches to telicity is that they take it as a discrete property that a verb either does or does not have. The SIH, on the other hand, considers that telicity is a gradient notion that could distinguish core UA verbs from peripheral ones.

The *for hours* construction, as a diagnostic of split intransitivity, is assumed to occur with atelic or UE verbs. Core UEs that do not denote an endpoint are compatible with durative time adverbials such as *for hours*, *for years* and *for days*, as in (10a). Peripheral UEs are compatible with the *for hours* constructions, as in (10b). However, if peripheral verbs of manner of motion are combined with a directional prepositional phrase (PP), they become incompatible with the

for hours constructions, as in (10c). Furthermore, semelfactive verbs like *jump*, which is classified as a peripheral UE, are controversial as to the degree of telicity. Some claim that they are basically telic (Rothstein, 2008), while others argue that they are basically atelic (Smith, 1997). The SIH helps to solve this issue, as it predicts that peripheral verbs such as these will exhibit variation.

(10) a. The man worked for hours.

b. The man ran for hours.

c. *The man ran to the park for hours.

Since intransitive verbs on the UA end of the SIH are differentiated mainly on telicity, it becomes the primary feature to separate UAs from UEs, with "telic change" at the core of split intransitivity. Thus, verbs of change of location and state such as *die* are inherently telic. Therefore, inherently telic UA verbs are incompatible with the *for hours* constructions, as in (11a). However, some verbs allow the *for hours* constructions in a restricted way. For example, when *arrive* is used with a plural noun as the subject, the sentence becomes acceptable because of aspectual coercion, as in (11b), and most peripheral stative verbs such as *exist* and *stay* are acceptable in the *for hours* constructions, as in (11c).

(11) a. *The man died for hours.

b. The guests are arriving for hours.

c. The building existed for years.

The Mandarin counterpart of the English *for hours* constructions does not function as a syntactic manifestation of split intransitivity. Both UAs and UEs can appear with durative time

adverbials with aspect marker *LE* after the verb, as in (12 a & b). UAs are compatible with durative time adverbials, suggesting a resultative reading, and UEs are also compatible with durative time adverbials, indicating either a resultative or progressive reading.

(12) a. Keren lai le san-ge xiaoshi le.
guest come ASP three-CL hours ASP
"The guest came and stayed for three hours."

b. Keren zou le san-ge xiaoshi le.
guest walk ASP three-CL hours ASP
" The guest walked/has been walking for three hours."

Thus, the availability of the PPPs and *for hours* constructions as indicators of the SIH holds in English, but not in Mandarin. Specifically, core UAs are mostly compatible with PPPs, but not with the *for hours* constructions in English, whereas in Mandarin, the UA-UE distinction does not manifest in either the V-*DE* construction or with durative time adverbials, as both UAs and UEs are possible with these two constructions.

The brief overview of split intransitivity has suggested that both English and Mandarin lack overt and consistent morphosyntactic markers for split intransitivity. That is, UAs in both English and Mandarin are not overtly identified by the presence of morphosyntactic markers such as auxiliary BE, nor are UEs overtly marked by morphosyntactic reflexes such as auxiliary HAVE. Furthermore, L1 Mandarin does not manifest the core-peripheral distinction in V-*DE* structure and durative time adverbial expressions. Then some interesting learnability problems arise. What evidence do Mandarin L2 learners rely on to acquire the UA-UE distinction? Would

they rely on semantic evidence to acquire the core verbs first? Would learners of English make the core-peripheral distinction part of their interlanguage grammar despite the less consistent and systematic evidence about split intransitivity in the English L2 input? These questions are related to previous research on the acquisition of split intransitivity to date.

2.4 Previous L2 Acquisition Studies on Split Intransitivity

Language acquisition, regardless of L1 or L2, is 'an important testing ground for theories of the lexicon-syntax interface' (Sorace, 2004, p. 251). Previous studies on split intransitivity have demonstrated that native speakers and non-native speakers of several languages are not only sensitive to the UA-UE distinction but also to the core-peripheral distinction (Baker, 2018; Balcom, 1997; Bard et al., 2010; Chung, 2014; Hirakawa, 2001, 2006; Ju, 2000, Kellar & Sorace, 2003; Laws & Yuan, 2010; Oshita, 2001; Pae et al., 2014; Sorace, 1993, 1995; 2000, 2004, 2011; Sorace & Shomura, 2001; Vernice & Sorace, 2018).

2.4.1 Previous Studies on the Core-peripheral Distinction

Evidence for the core-peripheral distinction of split intransitivity comes from studies employing both offline acceptability judgment tests and online processing tasks. These studies suggest that the SIH is found to explain gradience in many diagnostics of split intransitivity, and the syntactic manifestations of the UA-UE distinction tend to be acquired in a gradient fashion, starting with core verbs and gradually spreading to other verbs. The first evidence for the core-peripheral distinction comes from a series of studies by Sorace (1993a, 1993b, 1995, 1996).

Based on a series of studies on the acquisition of intransitive verbs in Italian as an L2,

Sorace (1993a, 1993b, 1995, 1996) investigates the role of lexical-semantic features on the acquisition of the syntax of split intransitivity. By testing L1 French L2 Italian learners' knowledge on the UA-UE distinction, she examines two most important diagnostics of split intransitivity in Italian —auxiliary selection and *ne*-cliticization. In Italian, UAs generally occur with auxiliary BE and UEs typically go with auxiliary HAVE in the perfect tense. UAs allow *ne*-cliticization, while UEs are not permissible with *ne*-cliticization (Belletti & Rizzi, 1981).

These empirical studies, adopting offline acceptability judgement tests, examined if the L2 acquisition of the syntax of split intransitivity is lexically constrained by the SIH and follows a developmental path that can be characterized by lexical-semantic terms. The experimental results show that stronger preferences for the correct auxiliary BE/HAVE over incorrect ones were found in core verbs than in non-core verbs at all the proficiency levels. Learners at the lower proficiency level have indeterminate judgments on most of stative verbs. The results also show that L2 learners' judgments on *ne*-cliticized sentences exhibit a similar pattern. Stronger preferences were found for *ne*-cliticized sentences with core UAs selecting BE at all the proficiency levels, and weaker preferences were found to come with non-core UAs. Lower proficiency level learners have most difficulty in acquiring the peripheral verbs instead of core ones. The results generally support the prediction that not only auxiliary selection but also *ne*-cliticization are sensitive to the lexical-semantic properties of the verb.

Sorace (2004) suggests that core verbs are the first ones to be acquired with the accurate auxiliary BE or HAVE in both L1 and L2 acquisition. The experimental results indicate that both native speakers and non-native speakers show differential judgments towards core and peripheral verbs. The L2 acquisition of syntactic properties of auxiliary selection generally

follows the developmental path that is predicted by the SIH. That is, the syntax of split intransitivity is acquired earlier with core verbs and later gradually extended to more peripheral ones. It is the position of verbs on the SIH, rather than their frequency, which determines the order of acquisition.

These studies also show that it is relatively easier to acquire the UA-UE distinction in a language such as Italian than in a language such as French. In Italian, the UA-UE distinction is manifested in the form of different auxiliaries in the perfect tense. The evidence for the distinction is quite consistent with core verbs. Compared with Italian, French offers more ambiguous and less systematic evidence for the distinction. Therefore, Italian learners of French face more difficulties acquiring the correct auxiliary with peripheral verbs, and do not overcome the problem even at the advanced level. The studies by Sorace (1993a, 1993b, 1995, 1996) suggest that L2 acquisition of auxiliary selection, as a syntactic diagnostic of split intransitivity, is lexically constrained by the SIH. The developmental path of the UA-UE distinction crucially depends on the interaction of semantic and syntactic manifestations as well as the robustness and consistency of the evidence for the distinction.

In addition to the above studies on Italian and French, other studies also examined the native speakers' different judgments on the core-peripheral distinction in Dutch (Sorace & Vonk, 1998), German (Keller & Sorace, 2003) and Paduan (Cennamo & Sorace, 2007). In order to demonstrate the cross-linguistic plausibility of the lexical-semantic hierarchy and the universality of the developmental routes in the acquisition of split intransitivity, Sorace and Shomura (2001) conducted a study on a language with different manifestations of split intransitivity from those auxiliary-selecting languages.

To investigate if the acquisition of the UA-UE distinction in L2 Japanese by English-speaking learners is sensitive to the lexical-semantic properties of verbs in a pattern similar to learners of Italian and French, who were found to be conditioned by the SIH, Sorace and Shomura (2001) tested knowledge of both native Japanese speakers and English-speaking L2 learners of Japanese on quantifier floating. In Japanese, evidence for split intransitivity is manifested in several phenomena such as quantifier floating (Miyagawa, 1989), case drop (Kageyama, 1993) and the form *takusan* (Kageyama, 1993, 1996).

Quantifier floating has also been analyzed as evidence for a movement analysis of scrambling in Japanese. According to Miyagawa (1989), a NP has to be adjacent to its numeral quantifier (NQ) because they must c-command each other. UAs allow quantifier floating as in (13a & b), while UEs disallow quantifier floating, as in (13 c & d).

(13) a. *Gakusei-ga sannin Tokyo-ni tsuita.*
student-NOM three Tokyo-at arrived
"Three students arrived in Tokyo."

b. *Gakusei-ga Tokyo-ni sannin tsuita.*
student-NOM Tokyo-at three arrived
"Three students arrived in Tokyo."

c. *Gakusei-ga sannin wazato waratta.*
student-NOM three intentionally laughed
"Three students intentionally laughed."

d. **Gakusei-ga wazato sannin waratta.*

student-NOM intentionally three laughed

"Three students intentionally laughed."

Examples like (13a) and (13c) are both grammatical because the subject NP (*gakusei*) and the NQ (*sannin*) are outside the VP and they c-command each other. (13b) is also grammatical because the surface subject NP is an underlying direct object, whereas (13d) is ungrammatical because the surface subject is a true subject and the NQ is inside the VP. Therefore, the mutual c-commanding relationship between the NP and NQ still holds for (13b) but not for (13d).

A total of 60 participants took part in the study, consisting of a group of 29 adult English-speaking L2 Japanese learners at the postbeginner level and a group of 31 adult English-speaking L2 Japanese learners at the intermediate level. There is also a group of 12 native Japanese speakers who served as a control group. The experiment had two tasks: a proficiency test and an acceptability judgment test. The native speakers were tested on two diagnostics of quantifier floating and Case drop. Since their performance on the Case drop test revealed that they did not accept the construction with any verb class, L2 Japanese learners were only tested on quantifier floating. For each UE verb, there was an acceptable sentence without quantifier floating, and an unacceptable sentence with quantifier floating. For each UA verb, sentences with and without quantifier floating are both acceptable. All the sentences were presented in random order.

The overall results for UEs indicate that native Japanese participants accept sentences without quantifier floating and reject those with quantifier floating. Furthermore, they show sensitivity to the finer distinctions among the verb types, rejecting core UEs more significantly than peripheral ones. Learners at lower proficiency level did not distinguish sentences with and

without quantifier floating, while learners at the intermediate level indicated the correct preference with all verbs, and they made finer distinction between acceptable and unacceptable sentences only with verbs of nonmotional process and motional process. However, the overall results for UAs indicate a rather uneven pattern of responses. Native Japanese speakers are overall more willing to accept UAs with quantifier floating than with UEs, but they also have an unexpected preference for sentences without quantifier floating with both core and peripheral verbs. The postbeginner learners did not show any sensitivity to the gradience, but the intermediate participants reveal a preference for sentences with quantifier floating, which is also found in the judgments of native speakers.

The results suggest that native speakers' judgments on UEs are consistent with the prediction by the SIH, and with more exposure to the positive evidence in the L2 and an increase in proficiency, L2 learners tend to develop in the direction of the native pattern. The study is to some extent exploratory because it indicates that the SIH is valid in Japanese split intransitivity, and learners rely on semantic evidence in acquiring the UA-UE distinction. However, their judgments on UAs do not exhibit a pattern predicted by the SIH, and Sorace and Shomura (2001) argue that the results for UAs come from the ambiguity of the Japanese input on UAs.

To sum up, Sorace and Shomura (2001) show that evidence from research on split intransitivity at the syntax-semantics interface in Japanese is consistent with the predictions of the SIH. Japanese may weigh the semantic features differently from auxiliary-selecting languages, but it seems that the SIH, as a working hypothesis, affects split intransitivity in Japanese and predicts the developmental path of acquiring the syntax of Japanese split intransitivity as an L2.

Further evidence for the core-peripheral distinction is provided by several studies employing online processing tasks (Bard et al., 2010; Roehhm et al., 2013; Vernice & Sorace, 2018). These studies provide support for the psychological reality of the core-peripheral distinction displayed in real-time processing of split intransitivity.

The study by Vernice and Sorace (2018) is among the few studies that investigated the processing of the subject of intransitive verbs and its effects on split intransitivity. Previous studies about transitive verbs indicate that animate agents are preferred over inanimate ones in sentence initial positions or in higher grammatical roles (Keenan & Comrie, 1977). Under certain conditions, animate agents are more likely to bear the prototypical grammatical functions of subjects, and they are preferred when they appear in subject position. On the contrary, when inanimate entities occur in the sentence-initial positions, it caused significant processing costs (Weckerly & Kutas, 1999).

To test the assumption of the gradient model of split intransitivity, which claims that agentivity is an essential property of UEs but not of UAs, Vernice and Sorace (2018) manipulated the semantic feature of the verb's argument, namely animacy, to examine if animacy affects the processing of Italian intransitive verbs. It is predicted that UEs, which typically denote agentive processes, will prefer animate agents over inanimate ones. A violation of animacy effects (an inanimate argument) could produce higher processing costs. It is also predicted that the animacy of the argument will not change the processing cost of UAs. Furthermore, the study also manipulated the SIH types (core/peripheral) with correct and incorrect auxiliary. It aims at finding whether an incorrect auxiliary could cause longer reading time when compared to a correct one and whether an incorrect auxiliary with a core verb also

causes longer reading time as compared to a non-core verb.

A group of 36 native speakers of Italian participated in the study, but the final analysis was based on 32 participants because two of them were excluded because of a lack of reliable data. They created 36 sets of test sentences, half involved UAs and the other half UEs. Among UAs or UEs, half of each verb types were core and the other half non-core. Each core verb was matched with a non-core verb of either UAs or UEs and was used as the main verb of the 18 sets of sentences.

The experiment was an eye-tracking study in which the participants' eye movement and reading time were recorded for analysis. The experimental results confirmed the prediction that the animacy of the verb's argument influenced the processing of the subject argument of UEs more than the processing of the subject argument of UAs. In other words, it found that native Italian speakers had a longer reading time when they read the sentences of UEs with an inanimate subject compared to animate subjects, but they are not sensitive to the animacy of the subject argument of UAs. Furthermore, the results for the core and peripheral UEs with animate and inanimate subjects suggest that the position of the verb on the hierarchy affected the processing of the animacy of the subject argument. In other words, core UEs are affected to a greater extent than peripheral ones when the subject argument is inanimate. Core UEs with inanimate subjects caused a longer reading time than peripheral ones with inanimate subjects.

What's more, the study also examined if auxiliary selection of Italian intransitive verbs was affected by the position of verbs on the SIH continuum. Recall that core telic UAs typically occur with the auxiliary *essere* (BE), while atelic agentive core UEs typically appear with the auxiliary *avere* (HAVE). Peripheral verbs that are neither telic nor agentive, are usually

associated to a weaker preference in choosing auxiliary. The results confirmed that the combination of an incorrect auxiliary with core verbs caused longer reading time than the combination of a correct auxiliary with non-core verbs. For non-core verbs, the presence of an incorrect auxiliary caused less significant effect. The study demonstrated that auxiliary selection is not only sensitive to split intransitivity but also to the core-peripheral distinction.

The study by Vernice and Sorace (2018) provides empirical evidence for the SIH by testing the semantic feature of agentivity through animacy manipulation of the verb argument. Only UEs are sensitive to the animacy of the verb argument, while UAs are not, suggesting that agentivity is a fundamental feature of UEs. Furthermore, the study also provides evidence for the gradient nature of the SIH. A mismatch between the animacy of the verb argument and the semantic property of the verb caused more processing costs in core UEs compared to non-core ones. A violation of auxiliary selection affects the processing of core verbs of each verb type more than non-core ones.

To conclude, it has been observed that the core-peripheral distinction in split intransitivity seems to be cross-linguistically consistent in languages with or without auxiliary selection. L2 acquisition of the syntax of split intransitivity tends to follow a developmental path that predicts core verbs have primacy in acquisition.

2.4.2 Previous Studies on Overpassivization

Numerous studies on passive UAs in English have often been cited as a kind of evidence for the UA-UE distinction. That is, UAs and UEs are represented differently in L2 learners' interlanguage grammars. It is reported that L2 learners from different L1s often have great

difficulty acquiring UAs but little difficulty with UEs. They were found to passivize UAs instead of UEs because UAs and UEs are claimed to have distinct underlying representations. It was also found that there is a between-verb variation in the overpassivization tendency. Some verbs are more likely to be overpassivized than others. Different accounts including syntactic, semantic and discourse factors were proposed for the overpassivization errors.

Zobl (1989) was the first to describe the phenomenon of passive UAs in a corpus study. Drawing on compositions written by 114 university students with different L1 backgrounds (90 Japanese, 10 Arabic, 10 Spanish, 1 Chinese, 1 Turkish, 1 Thai and 1 Indonesian), Zobl (1989) finds that L2 learners tend to overpassivize UAs, as in (14).

(14) a. *The most memorable experience of my life was happened 15 years ago.

b. *My mother was died when I was just a baby.

(Zobl, 1989:204)

Zobl (1989) finds that neither L1 transfer nor L2 input could account for such non-target forms of UAs. 90% of the participants in his study were Japanese. Japanese, as a verb final language, does not have postverbal NP structures. Similarly, L2 input in English does not provide any positive evidence for passive UAs either. Therefore, Zobl cites passive UAs taking the inappropriate form “be + V-en” as evidence for the Unaccusative Hypothesis. He suggests that UAs and UEs are represented differently in L2 learners’ interlanguage grammars. L2 learners tend to passivize UAs because UAs have some similarities with passives. On one hand, both have an internal argument but have no external argument. On the other hand, both involve a NP movement which moves the internal argument to the subject position. Zobl (1989) claims that passive UAs are an overt marker of the syntactic movement of the underlying object NP to

the subject position, and the difference between the native grammar and the non-native grammar is that the latter tends to mark the movement overtly with a passive morphology "be + V-en". Balcom (1997) provides further evidence for the Postverbal Movement Hypothesis proposed by Zobl (1989) through drawing on a grammaticality judgment test and a controlled production task. Results show that learners were also likely to produce passive UAs, but the production of the incorrect form is less frequent than in the grammaticality judgment task. The study of Balcom (1997) confirms Zobl's (1989) findings, indicating that UAs and UEs have different lexical representations in L2 learners' interlanguage grammars.

Yip (1990, 1995), however, rejects the Postverbal NP Movement Hypothesis proposed by Zobl (1989). Instead, she argues that L2 learners of English "somehow interpret ergatives (UAs) as underlyingly transitive (because only transitive verbs allow passivization in English)" (Yip, 1990, p. 53). Yip (1995) notes that L2 learners have problems with non-alternating UAs (UAs that do not have transitive counterparts). Yip (1995) cites some errors found in previous studies by L1 acquirers, as in (15a & b), and L2 learners, as in (15c) of intransitive verbs. She interprets these non-target performances of UAs in L2 learners' interlanguage grammars as showing that L2 learners treat UAs as underlyingly transitive verbs and hence tend to freely passivize them. She takes the production of passive UAs and the postverbal NP structures as evidence for the Transitivization Hypothesis.

(15) a. *Don't fall me down. (Bowerman, 1983)

b. *The shortage of fuels occurred the need for economical engine.

c. *This construction will progress my country. (15 b & c are from Rutherford, 1987)

Yip (1995) points out that it is not surprising that UAs pose a great learning problem for most learners of English. She suggests that learners' treatment of UAs as if they were passives can be taken as a result of the typological organization of English, "in which grammatical relations are based on the nominative-accusative system." (Yip, 1995, p. 143). The semantic role of agent is canonically mapped to the grammatical relation of subject, while the semantic role of theme to object. The mapping of the agent role to the subject of a transitive verb is the most preferred and productive mapping in English. UAs in English constitute an exception to this mapping in which the theme is mapped to the subject position. Fillmore (1968) pointed out that when a theme appears in subject position as in the passive, the verb needs an overt morphological marking to indicate the change in grammatical relations. L2 learners are thus following the generalization of overt marking to UAs.

Although the Postverbal Movement Hypothesis and the Transitivization Hypothesis both mention the similarities between UAs and passives, they have different views towards the nature of the similarities. The Postverbal Movement Hypothesis claims that learners' passive UAs are not derived from transitive verbs because no such errors are found in the corpus. The Transitivization Hypothesis, however, argues that L2 learners treat UAs as transitives because they seem to both accept ungrammatical transitive structures like *The magician disappeared the rabbit* and reject grammatical UA structures like *The rabbit disappeared*.

The problem with the syntactic accounts mentioned above is that they cannot address the possibility of individual verb differences in the rate of overpassivization. Some UAs are found to be more likely to be passivized than others that are also classified as UAs. If the overpassivization errors are generated only by syntactic movement, the different rates of

overpassivizaton will be left unexplained. Ju (2000) is the first to add a discourse factor (causation types) in accounting for the individual verb difference in overpassivization.

The notion of causation (a distinction between verbs which are internally caused and those that are externally caused) was first introduced by Levin and Rappaport Hovav (1995) to account for the distribution of verbs in the causative alternation. Specifically, verbs participating in the causative alternation such as *break* are characterized as externally caused, and those that do not show the alternation like *appear* are characterized as internally caused. Rappaport Hovav (2019), however, claims that the terms internally caused and externally caused verbs are something of a misnomer because the verbs themselves are not caused. Rather, internal causation indicates an event where the cause is intrinsic to the subject that can bring about the eventuality, while the external causation suggests the existence of some external cause such as an agent or an instrument that bring about the eventuality (Levin and Rappaport Hovav, 1995). In Levin and Rappaport Hovav' words, "the distinction between internally and externally caused eventualities is a distinction in the way events are conceptualized and does not necessarily correspond to any real difference in the types of events found in the world. In general, the relation between the linguistic description of events and the events taking place in the real world is mediated by the human cognitive construal of events, which is what we take our lexical semantic representations to represent." (1995, p.95).

Extending the notion of causation to the salience of the source of causation, Ju (2000) argues that the possible existence of a pragmatically conceptualizable agent, offered by logical inference and/or discourse in information, may influence the tendency for L2 learners to passivize UAs. Assuming the availability of agent is closely associated with the causality of an

event, Ju (2000) suggests that agents are easily conceptualizable in direct causation than in nondirect causation. Non-alternating UAs typically involve spontaneous change of state, but L2 learners would assume that there is an external causer that makes the change happen. In other words, depending on the speech contexts, L2 learners would interpret the argument structure of some UAs as having external causation. For example, compare the following two pairs of sentences in (16) and (17).

(16) a. A strange man was lurking by the garage.

b. Shortly after, the car disappeared.

(17) a. A car slid off the road and into the lake.

b. Shortly after, the car disappeared.

According to Ju (2000), the sentences in (16b) and (17b) are identical but the priming sentences in (16a) and (17a), which provide a context for the second sentence *Shortly after, the car disappeared* are different. In (16), it is predicted that the hearer would easily infer that there is an agent to move the car depending on the priming context. In (17), however, it is predicted that the hearer would not assume that there is an agent in the event because the priming context denotes an event that is a spontaneous process. Ju (2000) also notes that it is easier to assume an external causer for alternating UAs than for non-alternating ones because alternating UAs are assumed to denote externally caused events.

Ju (2000) hypothesizes that the availability of conceptualizable agents, which is evoked by the meaning of UAs and the discourse context, would motivate L2 learners of English to overpassivize UAs. She assumes that L2 learners of English are more likely to passivize UAs

in externally caused events than in internally caused events. Furthermore, she assumes that some UAs that can have transitive counterparts might interfere with the intransitive uses of those UAs. If such interference does exist, it would be predicted that the rate of overpassivization for alternating UAs would be significantly higher than that for non-alternating UAs.

To test the two hypotheses, Ju (2000) conducted a forced-choice task on 35 Chinese learners of English at a West Coast university. 10 native speakers were also recruited as a control group. Participants were asked to identify the more grammatical form (either active or passive) for the target sentence, as shown in (18).

(18) A fighter jet shot at the ship. The ship (sank/was sunk) slowly.

Ju (2000) also controlled the animacy of the target sentence since animacy plays an important role in choosing voice forms (Croft, 1995). All the subjects in the target sentences were inanimate. There are 18 UA verbs, 13 alternating and 5 non-alternating, tested in the experiment. The experimental results confirmed the first hypothesis that L2 learners are more likely to passivize sentences with external causation than those with internal causation. However, Ju (2000) did not find any significant difference between alternating and non-alternating UAs. The findings of the study indicate that L2 learners seem to perceive an agent or external causer in externally caused context, and they tend to passive UAs in such contexts. It is also noted that the same UA verb could pose different levels of difficulty because the construal of speech events is fundamentally subjective.

However, Kondo (2005) argues that causation types do not play an important role in

passive UAs. In a replication study, Kondo (2005) finds that Japanese and Spanish L2 learners of English tend to make more overpassivization errors with UAs compared to UEs, and the two groups are not more likely to overpassivize UAs in externally caused events than in internally caused events. Rather, the two groups differ in their treatment of alternating and non-alternating UAs owing to the morphological properties of the L1.

The problem with Ju's (2000) study is that only inanimate entities were used as subjects in the target sentences. The results show that L2 learners are more likely to passivize UAs in externally caused contexts than in internally caused contexts when the subject is inanimate. Ju (2000) assumes that passives and UAs share a similarity in that they both have nonagentive subjects, typically patients. Typologically different languages have different degrees of tolerance toward nonagent subjects. For example, English is quite flexible in what it allows in subject position, some other languages like French allow nonagent subjects only if they are marked with reflexives. Croft (1995) proposes an animacy hierarchy such as: human > animate > inanimate > abstract entities. The least marked (most natural) form of a subject would be a human agent that initiates the action on a patient. The most marked (least natural) form of a subject would be a patient or theme used as the subject, as seen in UAs. It is noted that the noncanonical mapping relationships cause conceptual difficulty in both L1 and L2 acquisition (Kellerman, 1979; Pinker, 1984). Ju (2000) concludes that it seems to be universal that L2 learners of different backgrounds appear to either passivize UAs or reject nonagent subjects in their interlanguage grammars.

Chung (2014) is the first to examine the factor of animacy in L2 acquisition of UAs. She investigates the factor of animacy by manipulating the animacy of the verb argument in the

target sentence. An animate being is likely to be linked to the subject since it is a prominent property of agent, and an inanimate being is more likely to be associated with the object because it is a typical property of theme. Given that the nature of the subject of a UA verb is typically nonagent, it is predicted that L2 learners would show a tendency to passivize UAs with inanimate subjects more frequently than with an animate subject.

Chung (2014) also examines whether causation types and L1 transfer influence L2 acquisition of alternating and non-alternating UAs since the results of Ju (2000) and Kondo (2005) are conflicting with each other. The subjects participating in the study are L1 Chinese and L1 Korean learners of English. In Korean, alternating UAs are marked morphologically, while in both English and Chinese they have zero morphology for UAs. If L1 Korean learners of English made more errors than L1 Chinese learners, it suggests that L1 transfer has a role to play in L2 acquisition of UAs.

99 Chinese and 117 Korean participants were recruited in the study, and were classified into four proficiency levels (elementary, lower intermediate, upper intermediate and advanced). Twelve UAs (6 alternating UAs and 6 non-alternating UAs) were chosen, and each verb was used in four different conditions as to causation types and animacy types. Chung (2014), following Ju (2000), administered a forced-choice task, with a priming sentence providing an either internally caused or externally caused context and a target sentence in which the subject is either animate or inanimate. Participants were required to select the correct form for the target sentence.

The experimental results indicate that both L1 groups are more likely to overpassivize UAs with inanimate subjects than with animate subjects, suggesting a role of animacy effects.

However, animacy effects only work on the lower proficiency level learners. As proficiency increases, L2 learners of higher proficiency overcome the animacy effects. The results also reveal an effect of causation types, confirming Ju (2000) but rejecting Kondo (2005). Both Chinese and Korean learners made more errors with UAs in externally caused contexts than in internally caused contexts. Finally, the results also show that while Korean learners are more likely to overpassivize alternating UAs than non-alternating UAs, Chinese learners did not make more errors with alternating UAs than with non-alternating ones. Chung (2014) assumes that the difference in verb alternation between the two L1 groups may be affected by L1 transfer. She argues that L2 input and the SIH effect (Unaccusative Hierarchy in her term) are not responsible for the difference.

The problem with the study by Chung (2014) is that she denies the role of the SIH in accounting for the difference in overpassivization rates based on the data from alternating and non-alternating UAs. However, it should be noted that the core claim of the SIH is based on non-alternating UAs. In order to examine the role of the SIH effect, it is better to investigate if L2 learners' tendency to passivize non-alternating UAs are sensitive to the SIH. There are two studies in the literature that investigate the role of the SIH on the overpassivization tendency of non-alternating UAs and UEs, but the results of the two studies are different.

The study by Yusa (2003) suggests that the non-target passive UAs in L2 acquisition of English reflect the auxiliary BE selection with UAs in perfective and past tense observed in Romance and Germanic languages. He claims that passive UAs do not result from the overpassivization of passive morphology of English but from a reflex of auxiliary selection. Assuming that L2 learners' interlanguage grammar is UG constrained, he suggests that some

properties not present in either L1 or L2 input indicate some properties present in other languages.

Yusa (2003) observes that auxiliary selection serves as a diagnostic for unaccusativity in some Germanic and Romance languages. In Italian, core UAs frequently occur with the auxiliary BE in the perfective tense, while core UEs are associated with the auxiliary HAVE. Such perfective auxiliary selection was also observed in old Japanese (Washio, 2001). The two auxiliaries *–tu* and *–nu* correspond to the counterparts of HAVE and BE in European languages. Though English has gone through a shift from the BE-dominated paradigm to the HAVE-dominated paradigm from 1700 to 1900, it is still available for some UAs which can occur with BE. If auxiliary selection is a universal phenomenon observed in languages including Japanese and some European languages, it is reasonable to assume that L2 learners have knowledge of perfective auxiliary selection.

If L2 learners are sensitive to the SIH, they would be predicted to 'incorrectly' accept auxiliary BE for telic core UAs more often than for atelic UAs and UEs. Similarly, they would also be more likely to make more errors with verbs which are placed higher than those which are placed lower along the hierarchy. In order to test the hypotheses, Yusa (2003) administered a grammaticality judgment test on a group of 31 Japanese L2 learners, whose TOEIC scores ranged from 385 to 655. All the participants were required to judge the grammaticality of sentences with UAs and UEs of different types on a 5-scale measure (from -2 to +2). Some test sentences are presented in (19).

(19) a. The clown wanted the children to laugh. He was fallen in the middle of stage.

b. We had a party yesterday. All the guests arrived on time.

The experimental results confirmed the prediction that Japanese learners are sensitive to the SIH. They know the ungrammaticality of passive UAs, but they incorrectly accepted telic UAs significantly more often than atelic UAs. Passive UEs were rejected more often than passive telic UAs and atelic UAs. Yusa (2003) thus argues that the difficulty Japanese L2 learners display with telic UAs result from the universal SIH. In other words, passive UAs, especially telic UAs, are a "natural and expected consequence of L2 learners' innate tendency to select *be* auxiliary" (Yusa, 2003, p. 255).

Hirakawa (2006), however, rejects the Perfective Auxiliary Marker Hypothesis proposed by Yusa (2003) and argues for the Postverbal NP Movement Hypothesis. Though Hirakawa (2006) admits that Yusa's study is informative in that it indicates that L2 learners are sensitive to the SIH, the results do not support Yusa's claim. According to Hirakawa (2006), the problem with Yusa's claim is that he treats the SIH and the perfective auxiliary selection as dependent phenomena. The ASH was proposed to account for the systematic variations with intransitive verbs in auxiliary-selecting languages, and the hierarchy tends to be the Unaccusative Hierarchy. The ASH is based on the semantic properties of verbs but not on auxiliary selection. Auxiliary selection is a consequence of the ASH. L2 learners probably exhibit sensitivity to telicity and agentivity, which paly essential roles in determining the UA-UE distinction along the hierarchy, but they might not have access to auxiliary selection.

In order to examine which hypothesis offers a better account for passive UAs, Hirakawa (2006) tested the Perfective Auxiliary Marker Hypothesis and the Postverbal NP Movement Hypothesis in her experiment, which made different predictions about the tendency to passivize UAs. The Perfective Auxiliary Marker Hypothesis suggests that L2 learners would accept core

telic UAs more often than other verb types because telic UAs strongly associate with the auxiliary BE in the past tense. The hypothesis does not predict that such errors would be expected with UAs in the present tense or in habitual contexts because only when denoting an event in perfective/past tense, UAs select the auxiliary BE. The Postverbal NP Movement Hypothesis, on the contrary, predicts that passive errors with intransitive verbs should be found in both present and past tense.

Hirakawa (2006) recruited a group of 25 Japanese-speaking L2 learners of English and a group of 12 native English speakers, who served as a control group. Four verb categories were tested in the study, including + telic UAs, - telic UAs, -control UEs, and + control UEs. Each verb type was represented by three verbs and each verb was used in two structures (intransitive and passive) and in two tenses (present and past). All the participants were required to take a grammaticality judgment test in which a pair of sentences were presented, and they were asked to rate the grammaticality of the second target sentence on a 4-pint scale, as in (20).

(20) a. People have confidence in the Japanese transportation system. (present tense)

Trains arrive/*are arrived on time.

b. John went to meet his friend at the airport. (past tense)

The plane arrived/*was arrived very late.

The experimental results revealed that L2 learners accept grammatical intransitive use of UAs both in the present and past tense. The results also show that learners tend to incorrectly accept passive UAs both in the present and past tense. The results suggest no verb type effects in rejecting the passive UAs in the present tense, but learners were more likely to accept

passives with +telic UAs, -telic UAs and -control UEs in the past tense. It was also found that learners reject ungrammatical passives with +control UEs as native speakers.

Hirakawa (2006) argues that the results are not compatible with the claim of the Perfective Auxiliary Marker Hypothesis but with the Postverbal NP Movement Hypothesis, which predicts no differences in the distribution of L2 errors between the present versus past tenses. She admits, however, that there is also a problem with the claim of the Postverbal NP Movement Hypothesis because it does not predict that peripheral UEs (-control UEs in her term) would cause any problems to L2 learners. It seems that the results obtained from the study do not fully support the two hypotheses.

The problem with the study by Hirakawa (2006) is that only four verbs in each category were tested and only one group of learners were recruited. The study of Yusa (2003) also recruited one group of learners. Moreover, both studies did not control causation types and animacy types in their task design, which are assumed to affect the L2 learners' overpassivization tendency. In order to examine the effects of SIH, more verbs from each verb category and more learners with different proficiency levels and L1 backgrounds should be taken into consideration.

2.5 Summary and Unresolved Problems

This section provides a brief overview of previous acquisitional studies on the core-peripheral distinction in split intransitivity and the two unresolved problems. Much evidence for the core-peripheral distinction mainly comes from previous studies on auxiliary-selecting languages in both L1 and L2 acquisition. A series of studies by Sorace (1993, 1995, 1996) reveal

that both native speakers and non-native speakers are sensitive to the SIH in L2 acquisition of auxiliary selection. English-speaking L2 learners of Japanese are also found to follow the developmental pattern predicted by the SIH (Sorace & Shomura, 2001).

The previous studies have offered us an important insight into how the UA-UE distinction is represented in L2 learners' grammars. It seems that L2 learners are not only sensitive to the UA-UE distinction but also to the core-peripheral distinction. Previous evidence for the core-peripheral distinction sheds light on the plausibility of the SIH in predicting the developmental path that can be characterized by lexical-semantic properties of verbs instead of frequency. The previous studies of the various accounts proposed for the overpassivization of intransitive verbs are also of great significance for our understanding of this unique L2 phenomenon.

However, some unresolved problems exist with the previous studies in two aspects. For one thing, although the SIH is plausible to capture the gradience of English split intransitivity (PPPs and the *for hours* constructions in the present study), there is a lack of studies to investigate if it is possible for Mandarin-speaking learners, whose L1 does not have an overt morphological marker for the UA-UE distinction, to acquire the subtle properties of the core-peripheral distinction at the lexicon-syntax interface. The learning problems with Mandarin learners in acquiring the PPPs and the *for hours* constructions are to discover the semantic and syntactic aspects of UAs and UEs. In other words, they should find out that the argument structure of UAs and UEs are different and that telicity is a fundamental feature of unaccusativity. Though the UA-UE distinction is a language universal, different languages encode the distinction in various language-specific diagnostics, which could potentially cause problems for Mandarin learners in the acquisition of the PPPs and the *for hours* constructions.

If there is a full transfer of the L1 Mandarin cognitive framework, as predicted by the Full Transfer/Full Access hypothesis (Schwartz & Spouse, 1996), it would be predicted that Mandarin-speaking L2 learners might have difficulty in learning how the distinction is manifested syntactically in English, but if they are likely to get access to UG, they would be expected to soon recognize the UA-UE distinction. Mandarin and English both lack overt and consistent morphosyntactic markers for split intransitivity. Furthermore, L1 Mandarin does not manifest the core-peripheral distinction in V-*DE* structure and durative time adverbial expressions. If there is a full access to semantic universals, Mandarin-speaking L2 learners should exhibit some sensitivity to the core-peripheral distinction at the lexicon-syntax interface. Given the correlation of the *for hours* constructions as well as PPPs with the SIH, it should then follow that split intransitivity will also manifest gradience in English, but it remains unknown if learners with L1s such as Mandarin, which also do not have a clear UA-UE distinction, can acquire the core-peripheral distinction in English.

For another, in addition to the syntactic account, causation types and animacy effects were found to affect L2 learners' tendency to overpassivize UAs. However, views on the SIH effect on overpassivization errors involving intransitive verbs remain divided. Yusa (2003) argues that L2 learners are sensitive to the SIH (the ASH in his term) based on the experimental results obtained from his study, while Hirakawa (2006) claims that the experimental results do not support the SIH on the basis of the results obtained from her study. More specifically, Yusa (2003) found that telic UAs are more likely to be passivized than atelic ones and UEs, while Hirakawa (2006) indicated that telic UAs are not more likely to be passivized than atelic ones. Instead, core UEs are less likely to be passivized than peripheral ones and UAs.

One possible reason for the conflicting results between Yusa (2003) and Hirakawa (2006) might be that variables such as causation types and the animacy of verbal arguments were not controlled in their study. That is, the test sentences presented in the two studies are not controlled for causation types and animacy types. Some priming contexts are either externally caused or internally caused, and the subjects of the target sentences are either animate or inanimate. To examine whether the SIH effect plays a role in the overpassivization tendency, it is better to investigate the SIH effect across the different conditions with respect to causation types and animacy types.

Therefore, the following two chapters are designed to deal with the two unresolved problems. Chapter 3 mainly investigates if the SIH makes a correct prediction for Mandarin-speaking L2 learners in acquiring the syntax of English split intransitivity through an acceptability judgment test. Chapter 4 examines if telicity and animacy effects have a role to play in the overpassivization tendency of intransitive verbs.

Chapter 3 Acquiring the Core-Peripheral Distinction in English Split Intransitivity

3.1 Introduction

As discussed in section 2.1, the Unaccusative Hypothesis, initially proposed by Perlmutter (1978) and later elaborated by Burzio (1986), classifies intransitive verbs into UAs and UEs based on their different syntactic and semantic properties. However, myriad empirical studies have repeatedly shown inconsistencies in the alignment between syntactic and semantic properties of split intransitivity (Borer, 2005; Levin & Rappaport Hovav, 1995). The SIH maintains that intransitive verbs are organized in a hierarchy defined primarily by telicity and secondarily by degrees of agentivity. Core verbs are more consistent with the syntactic diagnostics of the UA-UE split, while peripheral/non-core verbs exhibit gradience to varying degrees (Sorace, 2000, 2004, 2011). Much evidence for the core-peripheral distinction in split intransitivity has been found in a dozen topologically diverse languages. The SIH, therefore, is claimed to be a potentially universal hierarchy that may apply to many relevant syntactic diagnostics of split intransitivity in languages with or without auxiliary selection (Sorace, 2011). Furthermore, it is also claimed that core verbs have primacy in both L1 and L2 acquisition over peripheral ones (Keller & Sorace, 2003; Sorace, 2004).

Compared with Romance and other Germanic languages with auxiliary selection, English lacks an overt and obligatory morphosyntactic marker for split intransitivity. Instead, English presents many other syntactic diagnostics for split intransitivity, which is characterized by syntactic optionality. As discussed in Section 2.3, a great number of previous studies on L2 acquisition of English split intransitivity have investigated if L2 learners can acquire the UA-UE distinction in interlanguage grammars (Balcom, 1997; Hirakawa, 2003; Yip, 1993). Little

empirical evidence for the semantic core-peripheral distinction in English split intransitivity has been discussed in the literature except Baker (2018). By testing native English speaker's intuitions on different diagnostics of split intransitivity, Baker (2018) suggests that the SIH is also plausible to capture gradience of English split intransitivity. Few studies, to the best of my knowledge, have been conducted to investigate whether L2 learners of English can acquire the core-peripheral distinction at the lexicon-syntax interface.

Therefore, the present study aims to examine if Mandarin-speaking L2 learners of English can acquire the syntactic and semantic distinction in two constructions: the PPPs and the *for hours* constructions. The former is assumed as a syntactic diagnostic of split intransitivity (Alexiadou et al., 2004, p. 5; Levin & Rappaport Hovav, 1986, p.654), and the latter is considered as a diagnostic of split intransitivity that is sensitive to telicity (Schoorlemmer, 2004, p. 227). Taking the stand that split intransitivity is syntactically encoded but semantically determined, the present study is guided by the first research question put forward in Chapter 1, which is further divided into the following research questions.

1. Are Mandarin-speaking L2 learners of English sensitive to the syntactic UA-UE distinction?
2. Are Mandarin-speaking L2 learners of English sensitive to the semantic core-peripheral distinction?
3. Do core verbs have primacy in L2 acquisition of English split intransitivity compared to peripheral ones?

Previous studies (Hirakawa, 1999; Yuan, 1999) on L2 acquisition of the syntax of split

intransitivity indicate that L2 learners are aware of the UA-UE distinction since the distinction is cross-linguistically universal. However, L2 learners are also found to have great difficulties in acquiring the syntactic manifestations of split intransitivity in languages that do not present consistent and overt evidence for the UA-UE distinction. Thus, I propose the first hypothesis.

Hypothesis I

Mandarin-speaking L2 learners of English are aware of the distinction between UAs and UEs. To be more specific, L2 learners know that these two types of intransitive verbs have different argument structures. They will treat UA subjects like transitive objects and UE subjects like transitive subjects. They might also have difficulties in acquiring the two diagnostics of split intransitivity.

Evidence for the core-peripheral distinction in both L1 and L2 acquisition of split intransitivity in typologically different languages suggests that acquiring the subtle knowledge on the gradience at the lexicon-syntax interface is possible in Italian, French, German, Dutch and Japanese (Sorace, 1993, 1995; Sorace & Shomura, 2001). The SIH also predicts that acquisition of the syntax of split intransitivity starts with core verbs and then gradually spreads to peripheral verbs. Therefore, the second and third hypotheses are proposed as follows.

Hypothesis II

Mandarin-speaking L2 learners of English exhibit sensitivity to the semantic core-peripheral distinction at the syntax-lexicon interface. L2 acquisition of syntactic manifestations for the UA-UE distinction in English split intransitivity is lexically constrained.

Hypothesis III

Two of the main syntactic diagnostics of UA-UE distinction in English, namely, PPPs and the *for hours* constructions, tend to be acquired in a gradient way. To be specific, core verbs exhibiting consistent syntactic behavior tend to be acquired earlier than peripheral verbs exhibiting more variation.

3.2 Methodology

3.2.1 Participants

85 Mandarin-speaking learners of English as well as 30 native speakers of English (henceforth NS) took part in the experiment. Native speakers are from Canada, Britain, and America. All L2 participants, 20 males and 60 females, were university students of Huaiyin Normal University, China. The age of the L2 participants ranges from 19 to 24, and the average age of them at the time of testing was 21. None of them had been to English-speaking countries before. Following Chung (2014), I classified L2 participants into different levels of proficiency by having them take a proficiency test (Quick Placement Test [QPT], 2001). Their proficiency levels were then compared with the Association of Language Testers in Europe (ALTE) levels and divided accordingly. This resulted in two groups, an upper intermediate level learner group (henceforth Group 1) and an advanced level learner group (henceforth Group 2). The number of L2 participants and their respective levels are listed in Table 3.1, and an independent *t*-test indicates the QPT scores between the two groups of learners are statistically significant ($t = 18.24$, $p < .001$).

Table 3.1 Number of participants by proficiency level

QPT scores	QPT level (ALTE level)	Mandarin participants	Native speakers
40–47	Level 3 (Upper intermediate)	43	
48–54	Level 4 (Advanced)	42	
Total		85	30

3.2.2. Task and Materials

The task consists of two tests, a proficiency test and an acceptability judgment test. The proficiency tests were given to all the L2 participants immediately after they took the acceptability judgment test. Following Baker (2018), an acceptability judgment task was used in the study to evaluate sentence acceptability. A 5-point Likert scale was chosen instead of a 3-option approach for the sake of capturing the gradient acceptance of certain verbs in the two diagnostics of split intransitivity.

Although the UA-UE distinction is universal, different languages have different ways to encode the distinction syntactically. In English, some syntactic diagnostics are claimed to be sensitive to the distinction, including the resultative construction, *V one's way* (Marantz 1992), *V away* (Keyser and Roeper, 1984), cognate objects (Massam, 1990), the *for hours* constructions (Schoorlemmer, 2002), agentive-*er* (Burzio, 1981) and prefix-*out* (Keyser and Roeper, 1984) and PPPs (Alexiadou et al., 2004). Baker (2018) tested native English speakers' intuitions on all the above diagnostics of split intransitivity by a grammaticality judgment task. In this study, I will only focus on two diagnostics of split intransitivity — PPPs and the *for hours* constructions, which were discussed in detail in Chapter 2.

PPPs are assumed to be a diagnostic of unaccusativity on the ground that it picks out a

subset of UA verbs (Levin & Rapport, 1986; Alexiadou et al. 2004), while the *for hours* constructions are supposed to be compatible with atelic or UE verbs (Schoorlemmer, 2002). In order to test whether L2 learners could acquire the syntactic distinction as well as the semantic core-peripheral distinction in the two diagnostics, two experiment templates were created, as listed in Table 3.2. One more template was added as a control structure for the *for hours* construction. The *for hours* constructions take the form of NP V [$_{pp}$ *for hours/for minutes/for years*], while the control structure takes the form of NP-V order. The reason to add a control structure is twofold. Firstly, it was added to make sure that L2 learners' judgements on the *for hours* constructions are not influenced by the (un)acceptability of the sentences themselves. Also, it was added to examine whether L2 learners of the upper intermediate and advanced level still have problems in acquiring UA verbs in grammatical NP-V order as previous studies reported (Oshita, 2001).

Table 3.2 Experiment templates used in the experiment

Diagnostics	Template used in the experiment
Prenominal past participles (PPPs)	The PPPs NP VP
The *for hours* constructions	NP V [$_{pp}$ *for hours /for days*]
The control structure	NP V PP

To make sure that L2 learners are familiar with most of the intransitive verbs in the experiment, I selected thirty-two intransitive verbs from the basic College English vocabulary list. All the selected intransitive verbs were evenly divided by intransitive type (16 UAs and 16 UEs) and by the SIH type: half of those intransitive type verbs were core, and the other half

non-core. Verbs were classified as core or non-core/peripheral on the basis of their sematic features proposed by the SIH: core UAs were telic verbs of change of location and change of state, while non-core or peripheral UAs were verbs of continuation of state and existence of state; core UEs were verbs denoting controlled non-motional process, whereas non-core UEs were verbs either denoting controlled motional process or uncontrolled process. The verbs selected in the present study are given in Table 3.3.

Table 3.3 Intransitive verbs used in the experiment

UAs		UEs	
Core	Non-core	Core	Non-core
arrive	stay	travel	spin
decay	stand	sing	run
depart	seem	cry	tremble
disappear	remain	chat	dance
escape	exist	wait	walk
appear	continue	play	swim
arise	persist	shout	jump
fall	sit	work	slide

Each core verb was matched with a non-core verb of the same intransitive type in the three templates. For each template, thus, I created 16 sets of sentences: half (8) involved UAs, half (8) UEs. Each set of sentences with an intransitive type included 2 sentences, which were structurally identical, except for the verb, which is either core or non-core. There are all together 48 sets of sentences created. To counterbalance the number of grammatical and ungrammatical sentences, distractors were added. The final stimulus set contained 160 sentences including 96

test sentences and 64 distractors, all of which were presented in randomized order to each participant. The examples of one experimental set with a UA verb and a UE verb in the three different templates are presented in (21-23). The complete experimental set of all the test sentences are presented in Appendix A.

PPPs

(21) a. The arrived guest was in the garden. (core UA)

b. The stayed guest was in the garden. (non-core UA)

c. The sung boy was punished by the teacher. (core UE)

d. The run boy was punished by the teacher. (non-core UE)

The *for hours* constructions

(22) a. The bus arrived for hours at the station. (core UA)

b. The bus stayed for hours at the station. (non-core UA)

c. In the contest, the boy sang for three minutes on the stage. (core UE)

d. In the contest, the boy ran for three minutes on the track. (non-core UE)

The control structure

(23) a. The bus arrived at the station. (core UA)

b. The bus stayed at the station. (non-core UA)

c. In the contest, the boy sang on the stage. (core UE)

d. In the contest, the boy ran on the track. (non-core UE)

The verbs in the test sentences were mainly presented in the past tense, so I checked the frequency with which they were used in the present and past tense, to ensure that none were used predominantly in one tense or the other, which could potentially skew the results. By

means of a factorial analysis of variance (ANOVA) test, the overall lexical frequency of the core and peripheral verb classes of each intransitive type was controlled (F (3, 31) = .136, p = .938; F (3.31) = 2.028, p = .133, respectively). Information on the frequency of individual verbs was obtained from the English Lexicon Project Web Site. The English Lexicon Project, supported by the National Science Foundation, affords access to a large set of lexical characteristics, along with behavioral data from visual lexical decision and naming studies of 40,481 words and 40,481 nonwords. Table 3.4 and 3.5 present the data of the frequency of verbs in their past tense and present tense respectively.

Table 3.4 Frequency of verbs in the past tense

core UAs	frequency	peripheral UAs	frequency	core UEs	frequency	peripheral UEs	frequency
arrived	38.22	stayed	32.71	traveled	6.73	spun	1.69
decayed	7.73	stood	25.78	sang	8.22	ran	84.24
departed	2.71	seemed	54.25	cried	12.98	trembled	0.29
disappeared	28.80	remained	4.37	chatted	0.37	danced	9.35
escaped	19.43	existed	7.96	waited	29.12	walked	53.67
appeared	9.78	continued	7.25	played	56.27	swam	2.41
arose	0.82	persisted	0.27	shouted	2.25	jumped	21.14
fell	73.00	sat	28.61	worked	115.24	slid	1.84

Table 3.5 Frequency of verbs in the present tense

core UAs	frequency	peripheral UAs	frequency	core UEs	frequency	peripheral UEs	frequency
arrive	18.69	stay	515.65	travel	33.37	spin	14.63
decay	2.06	stand	226.2	sing	97.59	run	350.55
depart	2.14	seem	139.82	cry	65.65	tremble	2.24
disappear	20.96	remain	33.22	chat	16.27	dance	148.04
escape	44.27	exist	28.96	wait	830.25	walk	215.86
appear	23.37	continue	49.55	play	354.53	swim	31.8
arise	2.96	persist	1.2	shout	16.45	jump	69.82
fall	118.51	sit	311.35	work	798.02	slide	17.82

3.2.3 Procedure

For Mandarin-speaking L2 learners, the test was carried out in a classroom setting. Participants received both written and oral instructions. L2 participants were given the test on paper where detailed instructions were given in Mandarin in advance to make sure the participants would understand the requirements. When taking the tests, the participants were not allowed to consult dictionaries or any other reference books. They were not allowed to consult other participants or discuss the testing items with each other either. They were asked to complete the whole test carefully and independently.

They were required to judge each sentence on a 5-point Likert scale: 1 for “completely unacceptable”, 2 for “probably unacceptable”, 3 for “not sure”, 4 for “probably acceptable” and 5 for “completely acceptable”. The rating of 3 is about (un)certainty, while the rest of ratings

are about (un)acceptability. Although it is mentioned in the literature that the rating of 3 probably conflates certainty with acceptability (Ionin and Zyzik, 2014), it is still adopted in this study in order to capture gradience of English split intransitivity as suggested by Sorace (2004). The test is designed to examine if L2 participants have more determinate judgments on core verbs than on non-core/peripheral verbs in different purported diagnostics of split intransitivity. Therefore, L2 participants were also explicitly informed that they could answer "not sure" for as many questions as they liked. Similarly, if it takes some time for them to decide whether a sentence is acceptable or not, they should also choose "Not Sure".

After the test, a short survey was presented to the participants to ask them to pick out any verbs that they did not know. Data related to the unfamiliar words were deleted from analysis. The procedure was the same for the NS group, except that they conducted the test through Google Forms. Respondents were asked at the beginning of the survey if they were native speakers of English and what their nationality was. Data from non-native speakers are excluded from the final analysis. It took about 40 minutes to complete the survey.

3.3 Results

This section presents the results of the acceptability judgement test on PPPs and the *for hours* constructions. The data from three of the L2 participants of upper intermediate level (Group 1) and two of the L2 learner participants of advanced level (Group 2) were excluded from all analyses due to incomplete answers. The following analyses were therefore based on 80 L2 participants (Group 1: 40, Group 2: 40) and 30 native speakers of English (NS Group). For reference, PPPs are claimed to be compatible with UAs and the *for hours* constructions are

assumed to be compatible with UEs. A three-way (3 x 2 x 2) mixed ANOVA was conducted on PPPs and the *for hours* constructions separately, with groups as the between-subject factor, and verb types (UAs and UEs) and SIH types (core and non-core/peripheral) as the within-subject factors. The results of native speakers of English and Mandarin-speaking L2 learners' judgments of the two diagnostics are reported in order. Throughout the analyses reported below, the significance level used was .05.

3.3.1 Results for PPPs

This section examines L2 learners' performance on PPPs with four verb classes: core UAs, peripheral UAs, core UEs and peripheral UEs. Recall that PPPs, as a diagnostic of split intransitivity, are mainly compatible with UAs. The sole argument of a UA verb is base generated in object position, while the sole argument of a UE verb is base generated in subject position. Past participles can be only used as predicates over nouns which correspond to their initial (D-structure) objects, but not subjects. PPPs are mainly compatible with UAs of inherent change of location and verbs of change of state. It should also be noted, however, that not all verbs denoting change of location and state are compatible with the construction. Some UAs denoting change of location and change of state like *arrive* and *appear* are more compatible with this construction if they are modified by adverbs like *newly* and *recently*, as mentioned in Baker (2018). However, in order to balance the test sentences in this experiment, no adverb is used to modify the verbs irrespective of verb types and SIH types.

Overall results are reported in terms of mean acceptance scores. The descriptive statistics, including the mean acceptance scores (Mean) and standard deviations (SD) for the results of

acceptability judgments of PPPs with two verb types (UAs and UEs) and two SIH types (core and non-core/peripheral) across different groups are listed in Table 3.6. The overall judgments of the three groups on different verb types and SIH types are graphically represented in Figure 3.1, 3.2 and 3.3 respectively.

Table 3.6 Mean scores of the three groups in judging PPPs with core and peripheral UAs and UEs

verb types	Group 1 (N = 40)		Group 2 (N = 40)		NS (N = 30)	
	Mean	SD	Mean	SD	Mean	SD
Core UAs	3.74	0.81	3.70	0.99	3.74	0.56
Peripheral UAs	3.26	0.95	2.93	1.11	2.08	0.87
Peripheral UEs	3.13	0.89	2.73	1.12	1.38	0.43
Core UEs	3.03	1.17	2.63	1.19	1.30	0.54

As can be seen in Table 3.6 and Figure 3.1, upper intermediate level learners (Group 1) rated PPPs with core verbs of change of location and state higher than PPPs with peripheral verbs of continuation and existence of state. They rated PPPs with UEs slightly lower than that with peripheral UAs. However, there seemed to be no great differences among the three verb types. Moreover, Group 1 seemed to have an uncertain judgment on PPPs with peripheral UAs denoting existence of state and continuation of state compared to their judgments on PPPs with core UAs denoting change of location and change of state. A two-way ANOVA for Group 1, with verb types and SIH types as the repeated within-subject factors, showed a significant main effect of verb types, F (1, 39) = 15.97, p < .001, and a marginal significant main effect of SIH types, F (1, 39) = 5.18, p = .028.

Figure 3.1 Group 1: Mean acceptability scores on PPPs

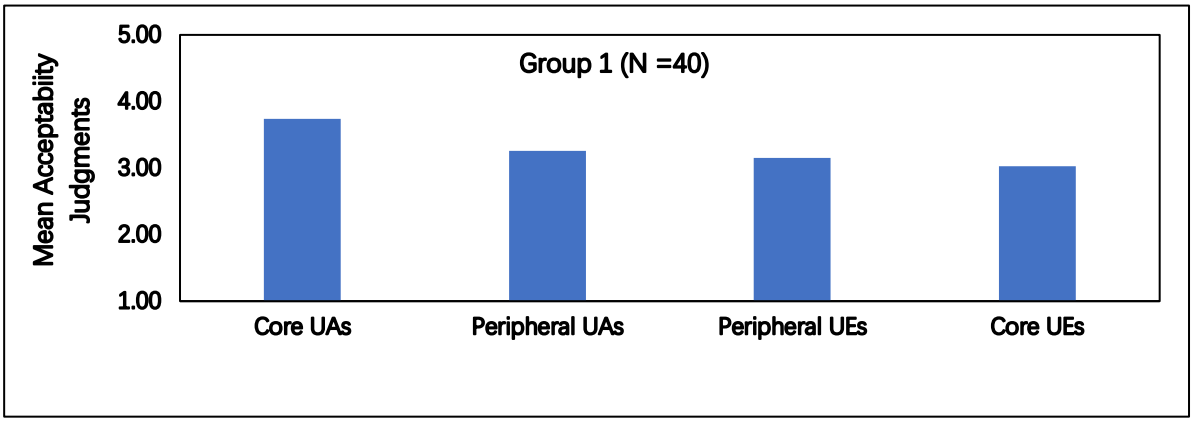


Figure 3.2 indicates that L2 learners of advanced level (Group 2), as expected, rated PPPs with core verbs denoting change of location and change of state the highest among all verb types. They also tend to least accept core UE verbs denoting controlled non-motional process in PPPs sentences. The mean scores of their acceptability judgments on UAs and UEs, no matter whether they are core and peripheral, are under 3, which means that their judgments on these three verb types range from probable unacceptability to uncertainty. They still did not have a clear rejection of UEs in sentences with PPPs. A separate two-way ANOVA for Group 2 showed a significant main effect of verb types, F (1, 39) = 31.39, p < .001, and a significant main effect of SIH types, F (1, 39) = 20.06, p < .001. There is some progress between Group 1 and Group 2 in terms of their judgements on the unacceptability of PPPs with UEs.

Figure 3.2 Group 2: Mean acceptability scores on PPPs

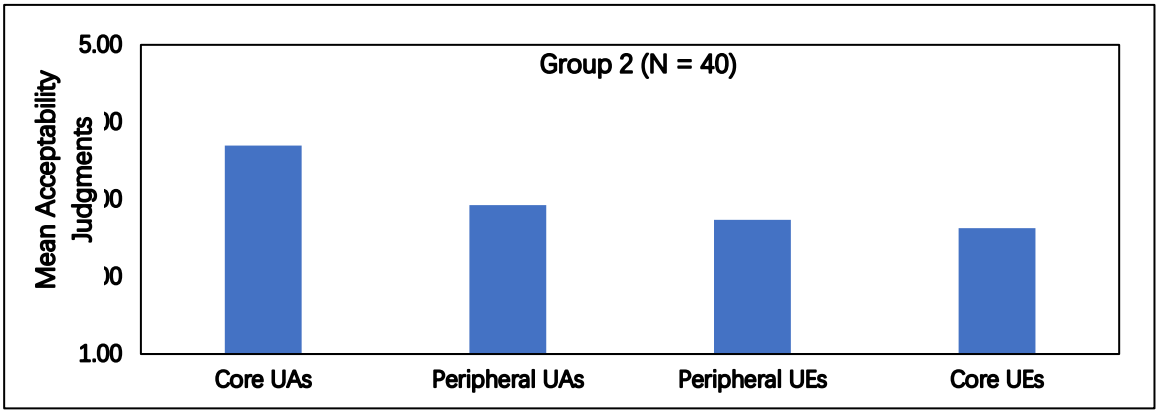
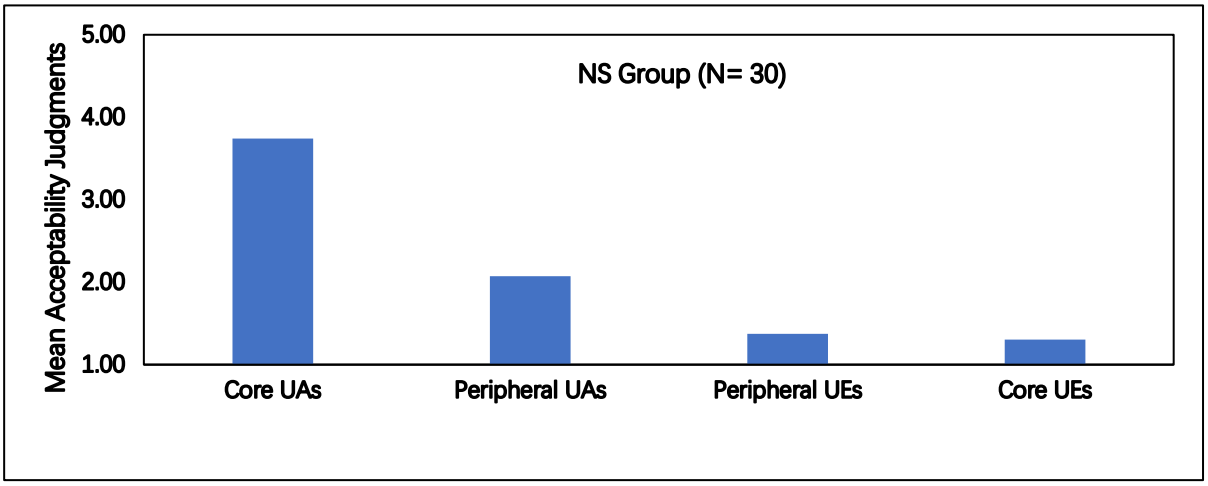


Figure 3.3 shows that native speakers of English (NS Group) scored PPPs sentences with core UAs much higher than sentences with peripheral ones, which is consistent to the SIH. They also rated PPPs with UE verbs much lower than that with UA verbs. They clearly rejected PPPs with UEs no matter whether they are core or peripheral, as predicted. They accept sentences with core UAs but not peripheral ones. A separate two-way ANOVA for NS Group showed a significant main effect of verb types, F (1, 29) = 180.11, p < .001, and a significant main effect of SIH types, F (1, 29) = 73.62, p < .001.

Figure 3.3 NS Group: Mean acceptability scores on PPPs



A three-way (3 x 2 x 2) mixed ANOVA was performed to investigate the main effect of verb types and SIH types on acceptability judgments of all the three groups, using group (Group 1, Group 2 and NS Group) as the between-subject factor, verb types (UAs/UEs) and SIH types (core/peripheral) as the repeated within-subject factors, with the mean acceptability judgment scores as the only dependent variable. The results indicate that the main effect of groups was statistically significant (F (2, 107) = 17.97, p < .001), as was the main effect of verb types (F (1, 107) = 181.03, p < .001) as well as SIH types (F (1, 107) = 86.64, p < .001).

The overall ANOVA also indicated several interesting interaction effects between the three independent variables: verb types, SIH types and groups. The ANOVA revealed that interaction effects between groups and verb types, F (2, 107) = 27.52, $p < .001$, group and SIH type, F (2, 107) = 14.83, $p < .001$, reached significance. Significant interactions between verb types and SIH types, F (1, 107) = 125.49, $p < .001$, verb types, SIH types and groups, F (2, 107) = 11.73, $p < .001$, were also obtained.

Once significant interactions were found, specific contrasts within the three groups were examined further. The main effect of groups and relevant interaction effects are reported in order. Since there is a significant main effect of groups, I further conducted a Bonferroni Post-hoc analysis. The results of the Bonferroni analysis show that Group 1 and Group 2 did not significantly differ from each other in their judgments on PPPs ($p = .333$), but there is significant difference found between L2 participants and native speakers of English ($p < .001$).

There is a significant interaction effect between verb types and groups. A simple main effect analysis was performed for each group thereafter. The simple main effect test confirmed that the mean scores of all three groups on UAs are significantly higher than those on UEs (Group 1: F (1, 107) = 14.89, $p < .001$; Group 2: F (1, 107) = 35.18, $p < .001$; NS Group: F (1, 107) = 163.16, $p < .001$).

Hypothesis I predicts that if Mandarin-speaking L2 learners of English made the UA-UE distinction syntactically, they should treat these verb classes differently in PPPs with UAs and UEs. These contrasts, tested in the acceptability judgment test, are presented in Figure 3.4. All the groups rated PPPs with UAs higher than that with UEs. The contrasts between verb types are significant for all groups as indicated by the overall ANOVA. The results further confirm

that though L2 learners are sensitive to the syntactic distinction between UAs and UEs, their knowledge on the distinction does not achieve a native level. They still have problems in realizing the unacceptability of PPPs with UEs.

Figure 3.4 The interaction effect between groups and verb types

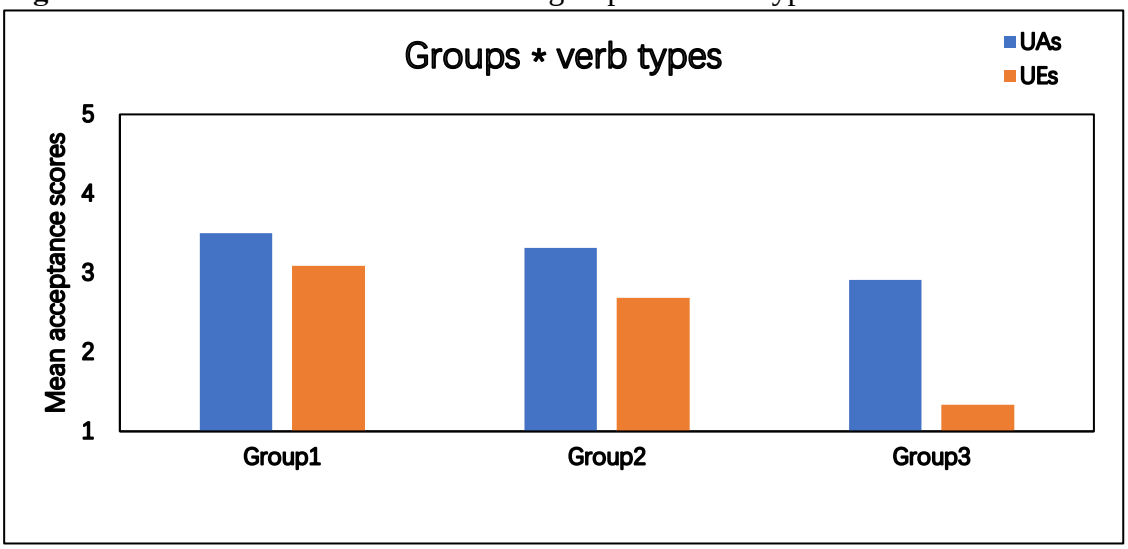
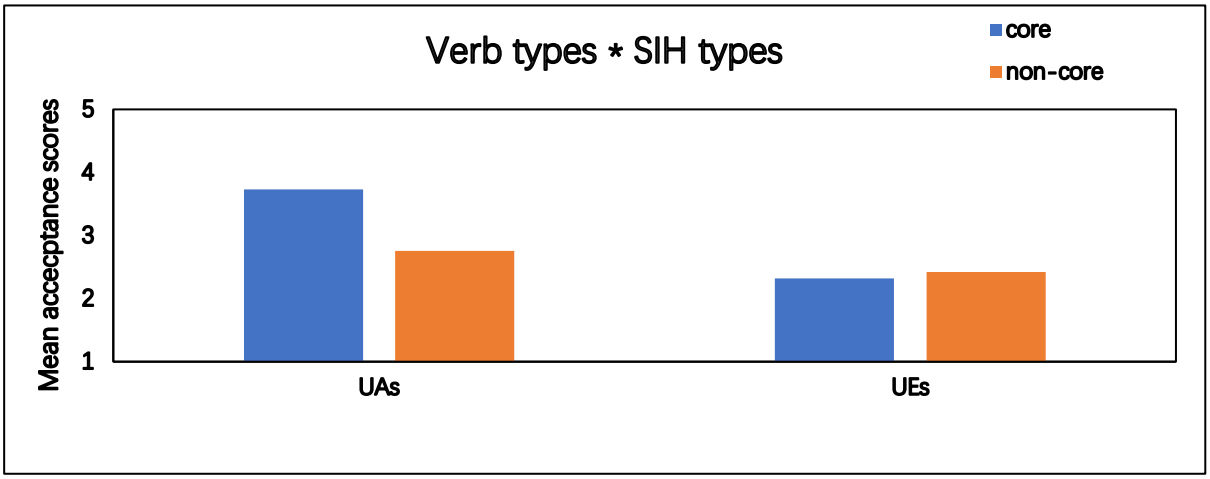


Figure 3.5 shows the interaction effect between verb types and SIH types. The mean scores of core UAs are significantly higher than those of peripheral UAs ($p < .001$), while the mean scores between core and peripheral UEs are not different at a significant level ($p = .082$).

Figure 3.5 The interaction effect between verb types and SIH types



To investigate the three-way interaction, the interaction plots between SIH types and verb types, separated by groups, are presented in Figure 3.6, 3.7 and 3.8 respectively. As can be seen in these three figures, for all the three groups, significant differences were found between core and peripheral verbs when the verb type is UA (Group 1: F (1, 107) = 16.36, p <0.000; Group 2: F (1, 107) = 43.37, p < .001; NS Group: F (1, 107) = 151.43, p < .001), while no significant differences were found between the core and peripheral verbs when the verb type is UE (Group 1: F (1, 107) = 1.57, p = .213; Group 2: F (1, 107) = 1.16, p = .283; NS Group: F (1, 107) =0.40, p = .527).

Figure 3.6 Group 1: The interaction effect between verb types and SIH types

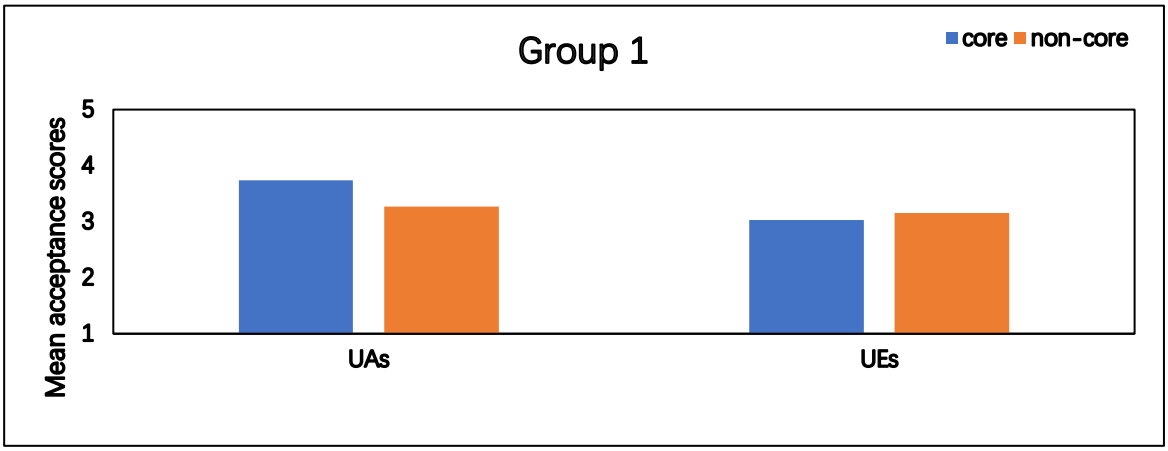


Figure 3.7 Group 2: The interaction effect between verb types and SIH types

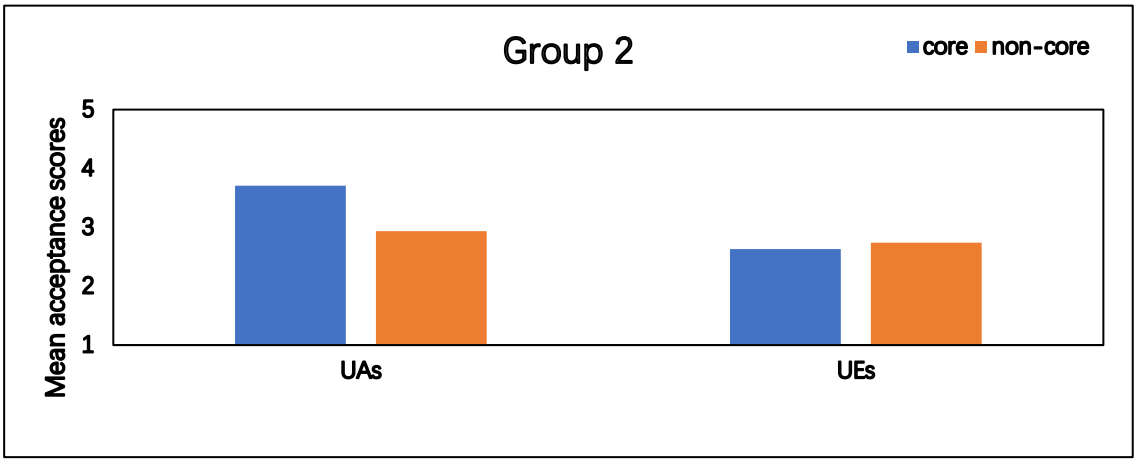
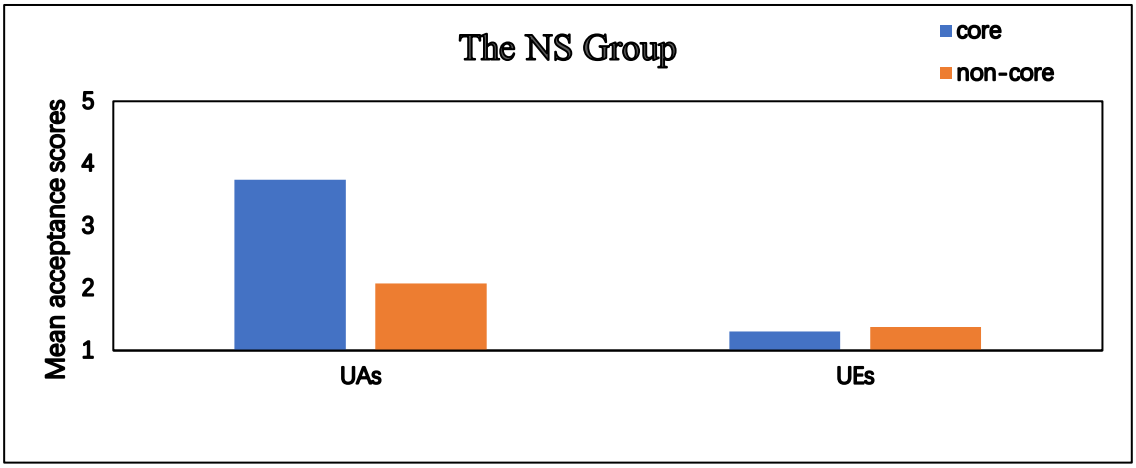


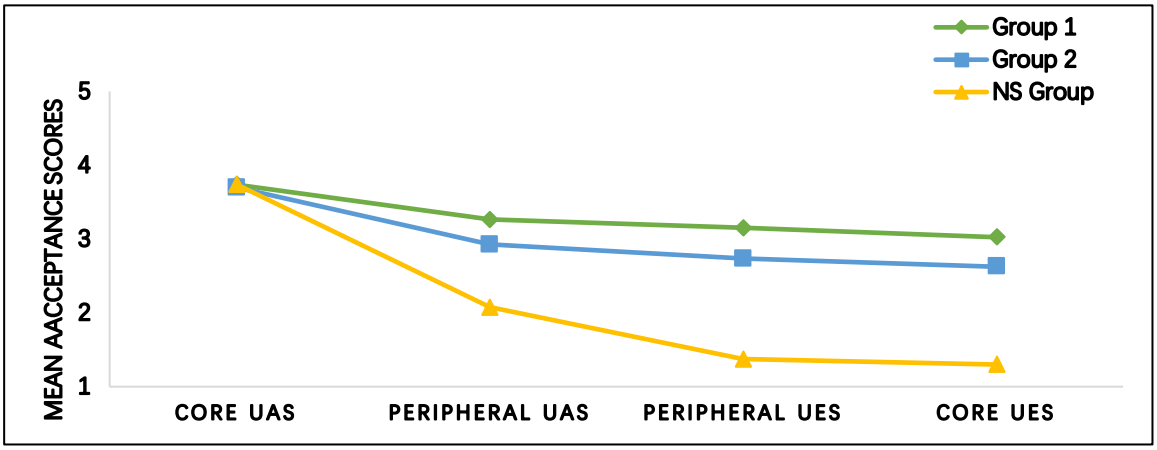
Figure 3.8 The NS Group: The interaction effect between verb types and SIH types



Hypothesis II predicts that if L2 learners are sensitive to the semantic core-peripheral distinction proposed by the SIH, they should treat core and peripheral or non-core verbs differently. As Figures 3.6-3.8 show, the pattern between core and peripheral UAs are different at a significant level in all three groups. Therefore, hypothesis II is confirmed. However, as can be shown in all the figures, no significant difference was found between core and non-core UE verbs. Contrary to what the SIH predicted, all the groups did not make significantly different judgments of PPPs with core and peripheral UE verbs.

Hypothesis III predicts that cores should be acuqired earlier and peripheral verbs are delayed in L2 acquisition. If the developmental pattern of split intransitivity is lexically constrained, Mandarin-speaking L2 learners' judgment on PPP with core UAs should be different on PPPs with peripheral UAs. In order to investigate the acquisition order of core and non-core verbs in PPPs, I compared Mandarin-speaking L2 learners' data with native English speakers' data. Figure 3.9 contrasts the overall mean acceptance scores of the three groups on PPPs with core and peripheral UAs and UEs.

Figure 3.9 The mean overall acceptability judgments of the three groups



As indicated by Figure 3.9, Mandarin-speaking L2 learners' judgments on PPPs with core verbs of change of location and state are almost the same as those of native speakers of English. A one-way ANOVA was performed only on core UAs, and the results confirmed that Mandarin-speaking L2 learners' judgments are not significantly different from those of native speakers of English, F (2, 107) = .027, p = .973. When it comes to other three verb types (peripheral UAs, core and peripheral UEs), a different picture was presented. Separate one-way ANOVAs were conducted on the rest of the verb types. The tests showed that L2 learners differed significantly from native English speakers in judgments on peripheral UAs, F (2, 107) = 12.71, p < .001, peripheral UEs, F (2, 107) = 21.99, p < .001 and core UEs, F (2, 107) = 36. 24, p < .001.

Since their judgments are different from each other on these verb types, the Bonferroni Post-hoc analysis was thereafter conducted. The results revealed that L2 learners have not realized the unacceptability of peripheral UAs and UEs in PPPs. Group 1 and Group 2 tend to have similar judgments on these three verb types (p = .402, p = .327, and p = .113 respectively). They have not achieved a nativelike performance on PPPs with peripheral UAs, core and

peripheral UEs (p = .002, p < .001, and p < .001 respectively). On the contrary, they have a nativelike performance on the acceptability of core UAs in PPPs. The results also implied that core UAs are acquired first, and peripheral UAs are likely to be acquired later before core and peripheral UEs.

In sum, Mandarin-speaking L2 learners of English, similar to native English speakers, exhibit a sensitivity to the syntactic UA-UE distinction. They also exhibit a sensitivity to the semantic core-peripheral distinction in PPPs as far as UAs are concerned. In addition, Mandarin-speaking L2 learners' performance is significantly different from that of native English speakers regardless of the syntactic or semantic distinction. However, despite non-native like performance on PPPs in general, Mandarin-speaking L2 learners showed similar performance in judgments of core UAs with native speakers. It is on the peripheral UAs that the three groups differ from each other in their judgments.

3.3.2 Results for the *For Hours* Constructions

This section examines Mandarin-speaking L2 learners' knowledge as well as NS group's performance on the *for hours* constructions with core UAs, peripheral UAs, core UEs and peripheral UEs. This section also investigates L2 learners' knowledge on the control structure. The control structure is created in the form of NP-V, while the *for hours* constructions are presented in the pattern of NP-V-f*or hours/for minutes/for years.* The same set of sentences were used in the control structure and the test template except for the time adverbials.

The expression *for hours*, as a diagnostic of telicity, is assumed to occur with atelic or UEs. Recall that intransitive verbs on the UA end of the SIH are differentiated mainly with respect

to telicity (goal-directedness). Telicity is the primary feature that can separate UAs from UEs, with "telic change" at the core of split intransitivity. Thus, verbs of change of location and state, such as *arrive* and *depart* are inherently telic and therefore exhibit more consistent UA behaviors than stative verbs such as *stay* and *remain*, which do not encode delimitedness. Therefore, inherently telic UAs are incompatible with the *for hours* constructions, which indicates time duration. However, some verbs allow the *for hours* constructions in a restricted way. For example, when *arrive* is used with a plural noun as the subject, the sentence becomes acceptable because of the aspectual cohesion. In order not to skew the experimental results, all the test sentence subject nouns are used in a singular form.

Recall that it is crucial to make sure all participants accept the sentences with UAs and UEs. Previous studies found that L2 learners of English with various L1 backgrounds have problems accepting UAs in the grammatical subject-verb (SV) order (Balcom, 1997; Yip, 1995). If L2 learners did not accept grammatical sentences with SV order, we could not attribute the unacceptability of the UAs in the *for hours* constructions to durative adverbials (e.g. *for hours* or *for minutes*). The results might also be attributable to their judgments on the control structure with UAs. Only if all participants do accept all intransitive verbs in the control structure does it become worthwhile to investigate whether they are sensitive to the semantic feature of telicity in the *for hours* constructions.

Native speakers' data as well as Mandarin-speaking L2 learners' data on the control structure, namely, the NP-V order, are examined first to make sure that their judgments on the control structure did not influence their performance on the *for hours* constructions. The descriptive statistics for the results of overall mean acceptability judgments of the control

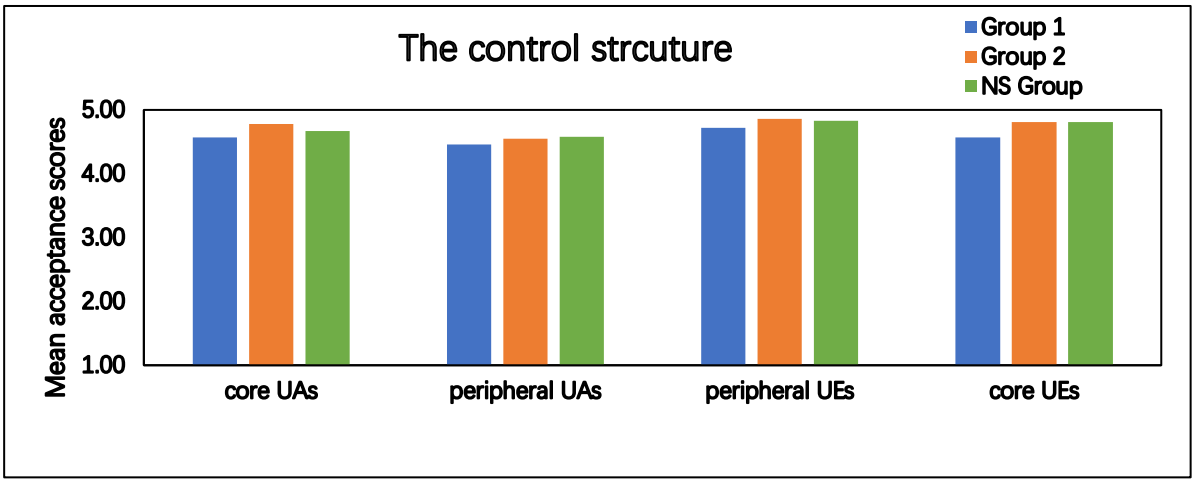
structure with two verb types (UAs and UEs) and two SIH types (core and non-core/peripheral) across different groups are listed in Table 3.7.

Table 3.7 Mean acceptability judgments on the control structure (the NP-V order)

Verb types	Group 1 (*N*=40)		Group 2 (*N*=40)		NS Group (*N*=30)	
	Mean	SD	Mean	SD	Mean	SD
Core UAs	4.57	0.48	4.71	0.40	4.67	0.47
Peripheral UAs	4.46	0.44	4.52	0.50	4.58	0.33
Core UEs	4.57	0.44	4.71	0.46	4.81	0.36
Peripheral UEs	4.72	0.33	4.81	0.31	4.83	0.22

As can be seen in Table 3.7, all the three groups accept all the verb classes in the NP-V order because the mean scores on different verb classes are all over 4.5, suggesting a judgment between probable acceptability and complete acceptability. They rated sentences with core UEs the highest among all the verb types, while they rated sentences with noncore UAs the lowest among all the verb types. Mean scores on UA type are comparatively lower than those on UE type. The contrasts among core UAs, peripheral UAs, peripheral UEs and core UEs are graphically represented in Figure 3.10. As Figure 3.10 shows, L2 participants made judgments on the control structure with UAs and UEs like the judgments made by native speakers of English.

Figure 3.10 Mean acceptability judgments of the three groups on the control structure



One factorial ANOVA was run on the results of the control structure with core UAs, non-core UAs, non-core UEs and core UEs separately. The one-way ANOVA revealed that Mandarin-speaking L2 learners of English had a nativelike performance on their judgments on the control structure with core UAs (F (2, 107) = 0.953, p = .389), non-core UAs (F (2, 107) = 0.673, p = .512) , core UEs (F (2, 107) = 2.251, p = .110) and non-core UEs (F (2, 107) = 2.782, p = .066). The results further confirmed that L2 learners of English in this experiment, irrespective of proficiency, all accepted the sentences in the control structure, exhibiting a native level judgment. What's interesting is that their judgements had the most variation on peripheral UEs, because of a marginally statistically significant p value.

To investigate the effect of verb types and SIH types in the control structure, a separate ANOVA for native speakers of English was conducted. The results indicated that the mean scores on the control structure with UAs and UEs differ at a statistically significant level, F (1, 29) = 7.872, p = .009. NS groups considered sentences with UE verbs are more acceptable than those with UA verbs. However, the mean scores on core and peripheral UAs and UEs did not differ at a statistically significant level, F (1, 29) = 0.683, p = .415.

Figure 3.11, 3.12 and 3.13 contrast each group's mean acceptance scores on the *for hours* constructions and its control structure by verb types and SIH types. Group 1 and Group 2 made similar judgments on NP-V sentences with core UA verbs and non-core UE verbs. Moreover, the mean scores of the *for hours* constructions with each verb type and SIH type, as expected, are generally lower than those of the control structure, suggesting that unacceptability of the *for hours* constructions with certain verb type is not affected by the control structure. To sum up, the results on the control structure, overall, indicate that the results on the *for hours* constructions are only affected by the durative time adverbials used.

Figure 3.11 Group 1: The *for hours* constructions (FH) and the control structure (CS)

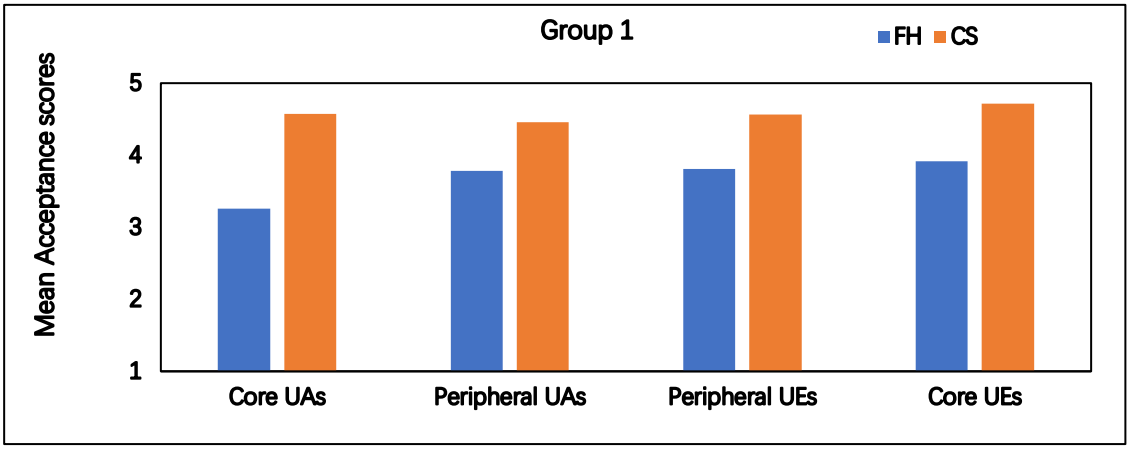


Figure 3.12 Group 2: The *for hours* constructions (FH) and the control structure (CS)

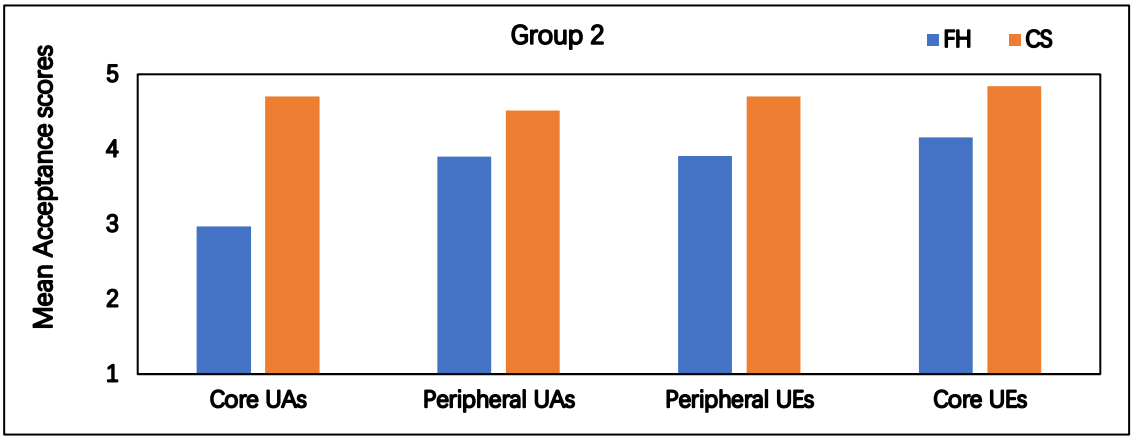


Figure 3.13 The NS Group: The *for hours* constructions (FH) and the control structure (CS)

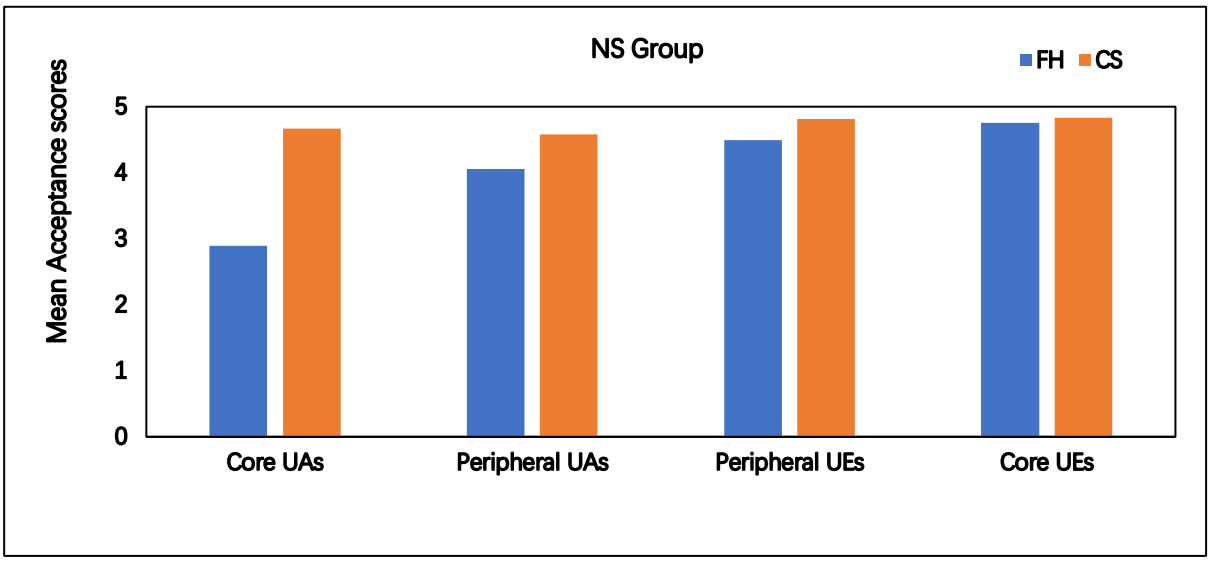


Table 3.8 summarizes the mean acceptance scores and standard deviations on the *for hours* constructions with different verb classes across different groups. Recall that telic verbs are claimed to be incompatible with the *for hours* constructions, while stative verbs and atelic UEs are compatible with the constructions. All groups considered core UAs the least compatible with the constructions, while they rated core UEs the most compatible with the constructions.

Table 3.8 Mean acceptability judgments on the *for hours* constructions

Verb types	Group 1 ($N = 40$)		Group 2 ($N = 40$)		NS Group ($N = 30$)	
	Mean	SD	Mean	SD	Mean	SD
Core UAs	3.26	1.01	2.97	0.85	2.89	0.84
Peripheral UAs	3.78	0.88	3.90	0.84	4.00	0.70
Core UEs	3.81	1.01	3.91	0.78	4.50	0.45
Peripheral UEs	3.92	1.12	4.16	0.74	4.75	0.24

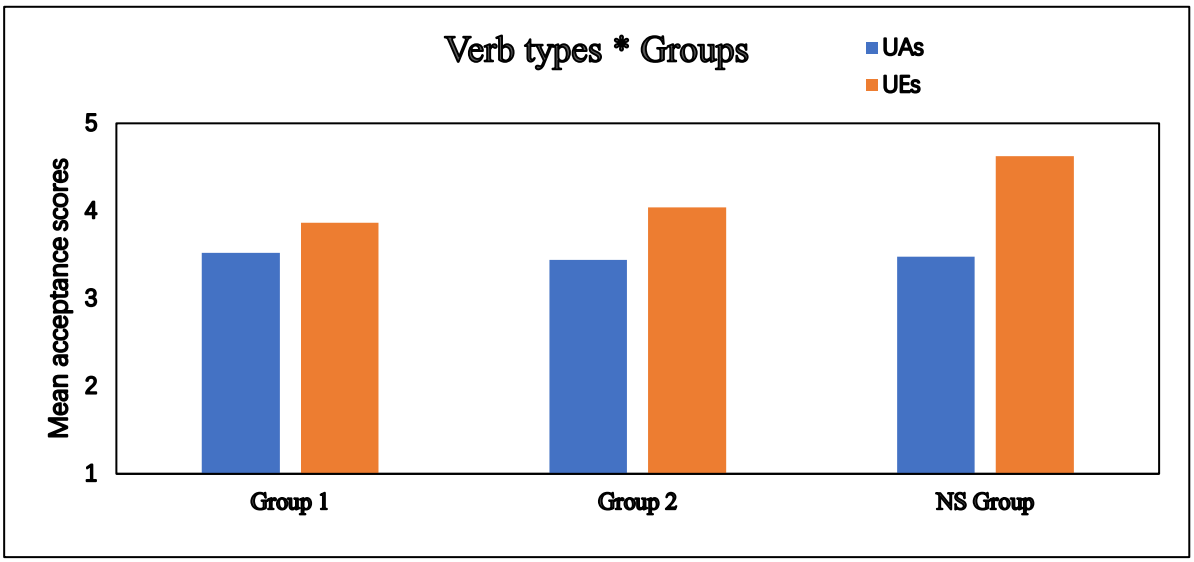
A three-way (3 x 2 x 2) mixed ANOVA was performed to investigate the main effect of

verb types and SIH types on the mean acceptance scores of the three groups in the acceptability judgment test, using groups (Group 1, Group 2 and NS Group) as the between-subject factor, verb types (UAs/UEs) and SIH types (core/peripheral) as the repeated within-subject factors, with mean acceptance scores as the only dependent variable. The ANOVA for the *for hours* constructions revealed a main effect for verb types (UAs/UEs), F (1, 107) = 121.17, $p < .000$, for SIH types (core/peripheral), F (1, 107) = 40.66, $p < .001$, and a marginal main effect for groups, F (2, 107) = 2.89, $p = .06$. The results also indicated that there are significant interactions between verb types and groups, F (2, 107) = 13.14, $p < .001$, between SIH types and verb types, F (1, 107) = 89.33, $p < .001$, and among verb types, SIH types and groups, F (2, 107) = 4.12, $p = .019$. Once significant interactions were established, specific contrasts within groups were investigated thereafter. The main effect of groups and relevant interaction effects are reported in order in the following part.

Since there is a marginally significant main effect of groups, we further conducted a Bonferroni Post-hoc analysis. The results of the Bonferroni analysis indicate that Group 1 and Group 2 did not significantly differ from each other in their judgments on the *for hours* constructions ($p = 1.000$). There is a marginally significant difference found between native speakers of English and Group 1 ($p= .079$), while no significant difference was found between the NS group and Group 2 ($p = .153$). The results suggest that L2 learners of advanced level (Group 2) have exhibited a nativelike judgment on the *for hours* constructions, while intermediate level learners are reaching a nativelike performance on the *for hours* constructions. Figure 3.14 demonstrates the significant interaction effect between verb types and groups. A simple main effect analysis was performed to locate where the interaction effect is. The simple

main effect test confirmed that the mean scores of all three groups on UA verbs are significantly different from those on UE verbs (Group 1: F (1, 107) = 10.8, p = .001; Group 2: F (1, 107) = 33.22, p < .001; NS Group: F (1, 107) = 91.53, p < .001). The analysis also revealed that there was no significant difference among all groups on their mean acceptability judgments on UAs, F (2, 107) = 0.15, p = .861, but significant difference was found on their judgments on UEs, F (2, 107) = 8.76, p < .001.

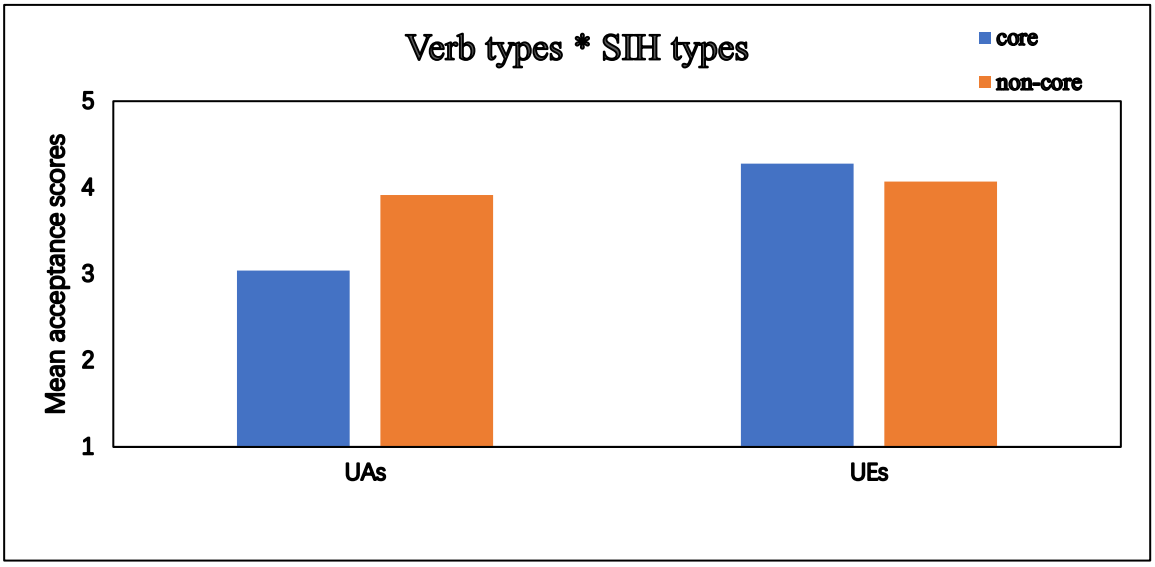
Figure 3.14 The interaction effect between verb types and groups



Hypothesis I predicts that if telicity is a primary semantic feature that defines English split intransitivity, L2 learners of English should treat UAs differently with UEs in the *for hours* constructions. As Figure 3.14 indicates, the mean scores of UAs are generally lower than those of UEs for all three groups, as expected. It also seems that the three groups did not differ from each other in their judgments on UAs, while their judgments on UEs are much varied. Native speakers of English, as predicted, accepted all sentences with UEs. Group 1 and Group 2, contrary to what we predicted, rated sentences with UEs as probably acceptable.

Figure 3.15 shows the interaction effect between verb type and SIH type. The UAs were rated less acceptable than peripheral UAs ($p < .001$), and core UEs were judged as more acceptable than peripheral UEs ($p < .001$).

Figure 3.15 The interaction effect between verb types and SIH types



To investigate the three-way interaction among SIH types, verb types, and groups, the interaction effects across groups were presented in Figure 3.16, 3.17 and 3.18 respectively. The simple main effect test revealed that for all the three groups, significant differences were found between core and peripheral verbs when the verb type is UA (Group 1: F (1, 107) = 10.51, p = .002; Group 2: F (1, 107) = 32.95, $p < .001$; NS Group: F (1, 107) = 38.64, $p < .001$). When the verb type is UE, Group 1 did not distinguish between core and peripheral UEs in the constructions, F (1, 107) = 2.03, p = 0.157, while Group 2, F (1, 107) = 9.94, p = 0.002, and NS group, F (1, 107) = 8.12, p = 0.005, distinguished between core and peripheral UE verbs.

Figure 3.16 Group 1: The interaction effect between verb types and SIH types

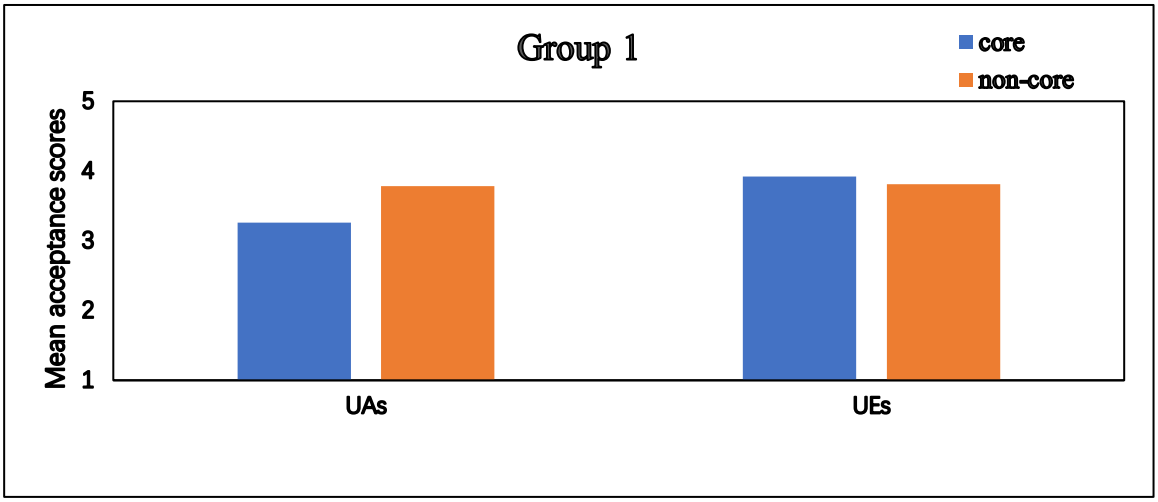


Figure 3.17 Group 2: The interaction effect between verb types and SIH types

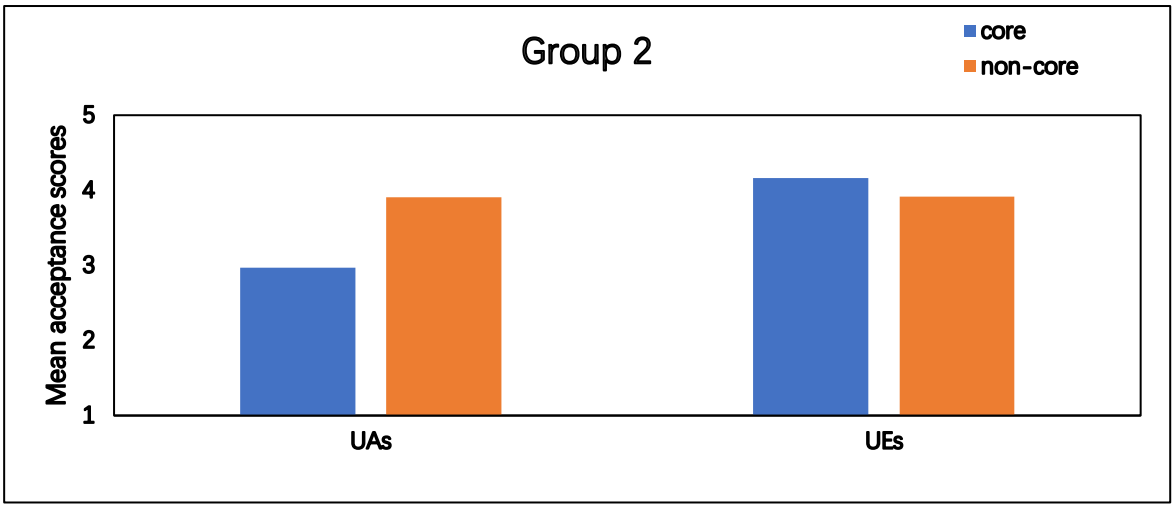
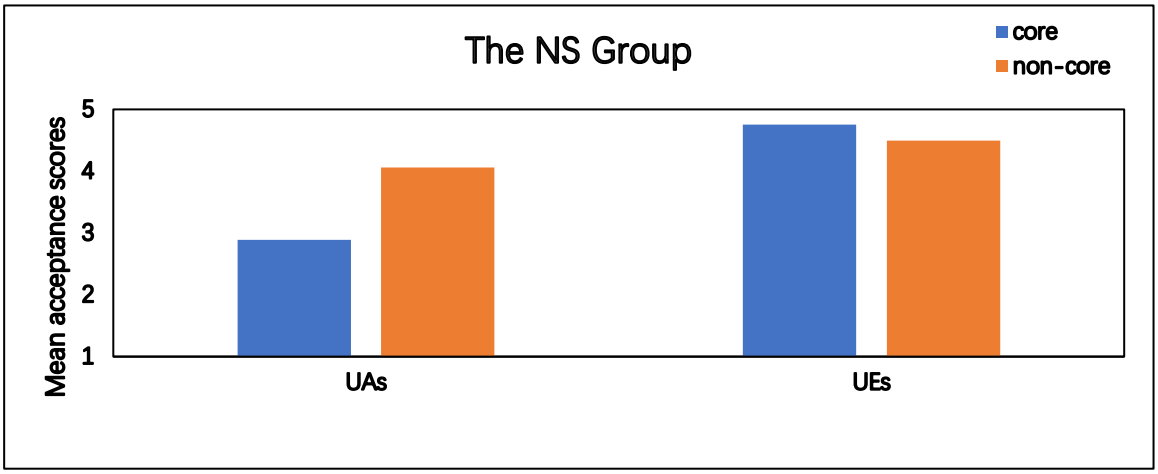


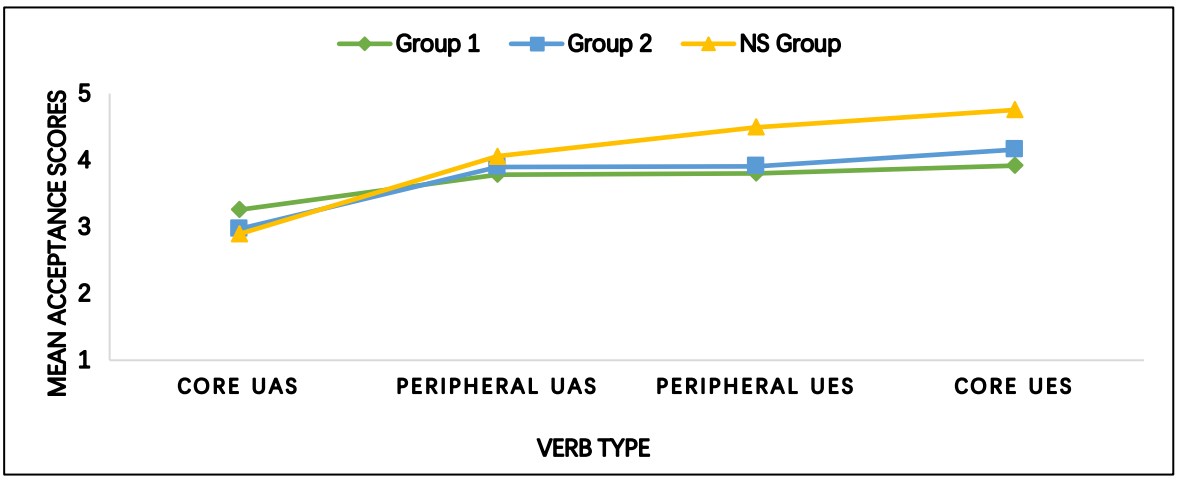
Figure 3.18 The NS Group: The interaction effect between verb types and SIH types



Hypothesis II predicts that if L2 learners are sensitive to the semantic core-peripheral distinction proposed by the SIH, they should reject the *for hours* constructions with core telic UAs (**The bus arrived for hours at the station*) more clearly than the *for hours* constructions with non-core stative verbs (*The bus stayed for hours at the station*). As the above figures show, all the three groups rated sentences with core UAs less acceptable than peripheral UAs. They distinguished between core and non-core UAs in the *for hours* constructions. The contrast between core UAs and peripheral UAs was significant for all the groups, confirming the hypothesis. However, Group 1 did not rate sentences with core UEs more acceptable than peripheral UEs, while Group 2 and the NS group did.

Hypothesis III predicts that that if the core-peripheral distinction is a universal hierarchy tending to capture English split intransitivty, the L2 acqusition of split intransitivity should start with core verbs and then gradualy spread to other peripheral verbs. In order to investigate the acquisition order of core and peripheral verbs in the *for hours* constructions, the mean acceptance scores of core and peripheral UAs and UEs of all the three groups are contrasted in Figure 3.19.

Figure 3.19 Mean acceptance scores of core and peripheral UAs and UEs



As indicated by Figure 3.19, Mandarin-speaking L2 learners' judgments of the *for hours* constrcutions with core and peripheral UAs are quite similar to that of native English speakers. A one-way ANOVA was performed first on core and peripheral UAs, and the results confirmed that Mandarin-speaking L2 learners' judgments are not significantly different from those of native speakers of English, F (2, 107) = 1.657, p = .195; F (2, 107) = .976, p = .380. The results, as predicted, suggest that L2 learners have acquired a targetlike judgment of the *for hours* constructions with core and peripherla UAs. However, contrary to what the SIH has proposed, peripheral UAs seemed to be acquired earlier than core UAs in the *for hours* constructions for Group 1 and Group 2.

Separate one-way ANOVAs were then conducted on the rest of verb types. The tests showed that L2 learners' judgments are sigficantly different from those of native speakers of English on peripheral UEs, F (2, 107) = 9.108, p < .001, and core UEs, F (2, 107) = 6. 939, p = .001. The Bonferroni Post-hoc analysis revealed that L2 learners have problems in accepting core and peripheral UEs in the *for hours* constructions, which is contrary to the prediction. Group 1 and Group 2 tend to have similar judgments on these two verb classes (core UEs: p = .0.577; peripheral UEs: p = 1.000). They have not achieved a nativelike performance on the constructions with core UEs (Group 1: p < .001; Group 2: p = .001), and with peripheral UEs (Group 1: p = .002; Group 2: p = .010).

To sum up, Mandarin-speaking L2 learners of English, similar to native speakers of English, exhibit sensitivity to the semantic feature of telicity in English split intransitivity. They rejected inherently telic core UA verbs in the *for hours* constructions. They accepted stative UA verbs as well as atelic UE verbs in the *for hours* constructions. However, despite a targetlike

performance on the constructions with core and peripheral UAs in general, Mandarin-speaking L2 learners of English differ significantly in their judgments on UEs. They tend to accept the UEs in the *for hours* constrcutions in a reluctant way.

3.2.3 Summary of Results

To summarize, the experimental results for PPPs indicated Mandarin speakers of all the groups rated PPPs with UAs higher than with UEs, but they still have problems in rejecting UEs in PPPs. They also show significantly different judgments on PPPs with core and non-core UAs. Despite non-native-like performance on PPPs in general, they have already exhibited a native-like performance on core UAs. As for the *for hours* construction, the mean acceptance scores for UAs are significantly lower than those of UEs. They also rejected core telic UAs in the construction more strongly than non-core UAs. They exhibited a native-like judgment on core and non-core UAs in the constrcution. What is unexpected is that the results also show that they seem to be reluctant to accept UEs in the construction comapred to native speakers.

3.4 Discussion

This section attempts to discuss the findings with respect to the research questions and the empirical findings of the previous studies. The three research questions that underlie this study are repeated here for convenience:

1. Are Mandarin-speaking L2 learners of English sensitive to the syntactic UA-UE distinction?
2. Are Mandarin-speaking L2 learners of English sensitive to the semantic core-peripheral

distinction?

3. Do core verbs have primacy in L2 acquisition of English split intransitivity compared to peripheral ones?

The answers for the first two questions are affirmative, and the answer to the third question is 'yes' as far as the acquisition of PPPs is concerned. The detailed explanations are presented in the following sections.

3.4.1 L2 Acquisition of the Syntactic UA-UE Distinction

The first research question explored how split intransitivity is syntactically represented in the interlanguage grammars of Mandarin-speaking L2 learners of English. The major results of two diagnostics of split intransitivity in the acceptability judgment test provide an affirmative answer to the first research question. Mandarin-speaking learners of English distinguished between UAs and UEs in PPPs and the *for hours* constructions. Their judgments of PPPs with UAs differed significantly from PPPs with UEs. They are also likely to reject the *for hours* constructions with UAs and accept the constructions with UEs as probably acceptable. The judgments on the *for hours* constructions with UA and UE verbs also reached significance. The overall results from the acceptability judgment test, with PPPs and the *for hours* constructions, suggest that L2 learners generally treat UAs and UEs differently in these two syntactic configurations.

The findings are consistent with previous studies in L2 acquisition of English split intransitivity claiming that L2 learners can acquire the knowledge of the UA-UE distinction in their interlanguage grammars (Balcom, 1997; Hirakawa, 1995; Oshita, 2001; Yip, 1995). L2

learners of various L1 backgrounds are sensitive to the UA-UE distinction, and they treated UAs differently from UEs. UA subjects are like transitive objects, getting projected in the object position as internal arguments at D-structure. UE subjects behave like transitive subjects, getting projected in the subject position as external arguments through the derivation.

In this study, L2 learners' knowledge on PPPs further confirmed that they are aware of the different syntactic properties associated with UAs and UEs. As discussed in Chapter 2, PPPs serve as a diagnostic of split intransitivity. Participles of transitive verbs can be used to modify the nouns comparable to their direct object like *a newly built house*. UAs are also compatible with this construction since the noun is originally an object in D-structure (*fallen leaves*), while UEs cannot be converted to such adjectival forms because the modified noun is originally a subject in D-structure (**a worked man*). In summary, nouns that can be pre-modified by past participles are understood as subjects of UAs or objects of transitive verbs. L2 learners, tested in this study, judged PPPs with UAs more acceptable than PPPs with UEs, suggesting that L2 learners know the argument associated with UAs is internal and the argument associated with UEs external.

Previous studies have also shown that L2 learners of English represent UAs and UEs differently in their interlanguage grammars. They are reluctant to accept the grammatical form of UAs in the SV order on one hand, and they tend to accept or produce nontarget forms in which UAs appear in the passives on the other hand (Hubbard, 1994; Ju 2000; Chung, 2014). Some studies reported that even advanced learners have problems in learning UAs (Oshita, 1997). This experiment only tested the NP-V order, and passive UAs will be fully investigated in Chapter 4. The findings from the control structure of the *for hours* constructions, namely, the

structure taking the SV order, are contrary to what have been observed in the literature. Mandarin-speaking L2 learners of English in the study have shown a target-like judgment on UAs in the SV order. Despite the mean score for UAs is generally lower than that for UEs, their overall judgments on UAs and UEs are almost nativelike. The comparative lower scores on UAs might be owing to the task effect. For example, when *sit* and *stand* used as UAs, they indicate a sense of "assuming a specific position", while they are UEs, they carry the sense of "maintaining a specific position" (Levin & Rappaport Hovav, 1995, p. 163). When combined with an inanimate subject in sentences with active voice, participants tend to accept them with a weaker preference.

The results of the present study are consistent with many previous studies on L2 acquisition of the UA-UE distinction in Mandarin (Yuan, 1999), Japanese (Hirakawa, 2001; Sorace and Shomura, 2001). The studies reveal that L2 learners are found to be sensitive to the UA-UE distinction, but they have greater difficulty in learning the syntactic configurations of the distinction. What might account for L2 learners' sensitivity to the UA-UE distinction in acquiring English split intransitivity?

First, in the L2 input, all intransitive verbs look alike to each other in that they all have one argument and appear in the identical SV order. What L2 learners of English observe in the input are S-structure representation of UAs such as *John came* and UEs such as *John laughed*. The surface representation alone would not suffice to tell learners about the different argument structures of UAs and UEs.

In addition, English lacks clear-cut morphosyntactic evidence for the distinction. Italian has an evident UA-UE distinction through auxiliary-selection. UAs usually select the

counterpart of BE while UE verbs select the counterpart of HAVE in the perfective aspect and past tense (Burzio, 1986). Previous theoretical studies on split intransitivity in English have revealed that the syntactic diagnostics of the UA-UE distinction generally consist in optional constructions that are possible with UAs but not with UEs, or vice versa (Levin & Rappaport Hovav, 1995; Baker, 2018). For example, some UAs denoting change of location and state are compatible with PPPs, while UEs are disallowed. Stative UAs and atelic UEs are possible with the *for hours* construction but not with inherently telic UAs. There are no obligatory markers of unaccusativity, nor are there obligatory markers of unergativity (Sorace & Shomura, 2001). Thus, L2 learners do not get overt and systematic evidence about split intransitivity in L2 input. What's more, the UA-UE distinction is not explicitly provided to L2 learners. According to Juffs (1998), the distinction is never taught in foreign language classrooms and is generally underrepresented in language teaching materials. L2 learners are not likely to acquire the UA-UE distinction from explicit instructions.

To sum up, for L2 learners of English, the input alone is insufficient to acquire the distinction since the difference in argument structure of UAs and UEs is not explicitly demonstrated. The difference in their argument structures is only found at the D-structure representation, which makes the difference difficult for L2 learners to observe. Furthermore, English does not have unambiguous and overt morphosyntactic markers that could distinguish UAs from UEs. Syntactic diagnostics of English split intransitivity consist of optional constructions allowed either by UAs or UEs. Finally, the UA-UE distinction is seldom taught explicitly either in a classroom setting or in a natural setting. Then a question arises: what evidence does the learner rely on to acquire the UA-UE distinction as well as the syntactic

manifestations?

One possible answer is L1 transfer. Different from L1 acquisition, adult L2 learners begin the acquisition process fully constrained by the representations of their native languages, as proposed by the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1996). L1 transfer is the initial state of L2 acquisition. L1-Mandarin, therefore, serves as the initial state of L2 acquisition of English split intransitivity. Mandarin, similar to English, has the UA-UE distinction. Existential constructions are found to be sensitive to the UA-UE distinction in Mandarin (Yuan, 1999; Laws & Yuan, 2010). The well-formedness of (24a) and (24b) indicates that UAs in Mandarin can appear either preverbally or postverbally. UEs, in contrast, can only appear preverbally, as shown in (24c) and (24d).

(24) a. keren lai-le.
guest come-PERF
"The guest came."

b. lai-le keren.
come-PERF guest
"There came a guest."

c. keren xiao-le.
guest laugh-PERF
"The guest laughed."

d. *xiao-le keren.
laugh-PERF guest
* "There laughed a guest."

(25) a. lai de ren
arrive NOM man
"the man who has arrived/is arriving"

b. xiao de ren

smile NOM man

"the man who is smiling"

However, Mandarin lacks participles, irrespective of past or present, to modify prenominal nouns. Verbs can modify a noun prenominally if they are attached to *DE*, as in (25 a & b). If L1 transfer plays a role at early and intermediate stages of interlanguage development, we would expect that L2 learners make overgeneralization errors by accepting both UAs and UEs in PPPs. The experimental results, however, indicate intermediate and advanced L2 learners tend to show a stronger preference of PPPs with UA verbs. Moreover, the equivalent structure of PPPs in Mandarin, namely the V-*DE* structure, does not serve as a syntactic diagnostic of split intransitivity for Mandarin UA-UE distinction.

On the other hand, both UAs and UEs can appear with durative time adverbials in Mandarin, as in (26a & b). UAs are compatible with durative time adverbials, suggesting a resultative reading. UEs are also compatible with durative time adverbials, indicating either a resultative or progressive reading. Like the Mandarin counterpart of PPPs, the durative time adverbials do not serve as syntactic evidence for the UA-UE distinction in Mandarin. Thus, L1 transfer alone seems to be insufficient to account for the acquisition of UA-UE distinction.

(26) a. Keren lai le san-ge xiaoshi le.

guest come ASP three-CL hours ASP

"The guest came and stayed for three hours."

b. Keren zou le san-ge xiaoshi le.

guest walk ASP three-CL hours ASP

“ The guest walked/has been walking for three hours.”

The other possible answer is UG. When the relevant properties cannot be acquired on the basis of L2 input or as a direct transfer of a similar structure in L1, we argue that L2 learners are faced with a poverty of stimulus problem, which is also called the logical problem of language acquisition. There is an enormous gap between the input available and the knowledge acquired by the L2 learners. This part of knowledge, therefore, is claimed to come from UG. Universal principles like UTAH (Uniformity of Theta Assignment Hypothesis), which supports the Unaccusative Hypothesis, are available to L2 learners as well. L2 learners know that the sole argument of UAs is an internal argument, while that of UEs is an external argument. I take the experimental results reported in this study as evidence for the availability of UG in L2 acquisition of English split intransitivity.

However, the findings reported in this study cannot tell whether UG fully restricts adult L2 acquisition or it can only partially access L2 acquisition via L1. Within the generative approaches to SLA, there have been controversies as to the accessibility of UG in L2 acquisition. Some claim that UG is fully accessible (Schwartz & Sprouse, 1996; White, 2003), while the others argue that UG is only accessible through the L1 (Bley-Vroman, 1990). Hale (1996) even argued that it is very difficult to differentiate whether it is access to UG or L1 transfer that guides L2 acquisition. To be specific, given that all languages have a UA-UE distinction, including Mandarin. Mandarin-speaking L2 learners’ knowledge of split intransitivity might come from their L1. That is, L1 provides a basis for the knowledge of split intransitivity.

Although the overall results suggest that Mandarin-speaking L2 learners of English are sensitive to the UA-UE distinction, they have protracted difficulty in acquiring the syntactic

distinction of PPPs and the *for hours* construction. What might cause difficulty in L2 acquisition of the syntactic evidence for the distinction? There might be two reasons for the difficulty. First, this difficulty arises from the inconsistency and ambiguity of L2 input, because the UA-UE distinction in English is not overtly marked in the input and characterized by syntactic optionality. Even though the UA-UE distinction is language-universal, different languages manifest the distinction via various language-specific diagnostics. L2 learners, therefore, have to notice the different syntactic configurations that are sensitive to the UA-UE distinction, suggesting that the acquisition of the syntactic diagnostics is more difficult. English, like Mandarin and Japanese, lacks an unambiguous and consistent morphosyntactic marker for the syntactic UA-UE distinction. Second, the difficulty comes from L1 transfer. The PPPs and the *for hours* constructions are assumed to be sensitive to the UA-UE distinction in English, while their Mandarin counterparts do not serve as a diagnostic of split intransitivity. Mandarin L2 learners tend to incorrectly accept PPPs with UEs. Mandarin-speaking L2 learners in the present study have acquired a target-like knowledge on the SV order, but their knowledge on PPPs and the *for hours* constructions is still not native-like. The results are consistent with the predictions.

3.4.2 L2 Acquisition of the Semantic Core-Peripheral Distinction

With the interface (lexicon-syntax) approach adopted in this study, the second research question examined if Mandarin-speaking L2 learners of English can exhibit sensitivity to the core-peripheral distinction in diagnostics of split intransitivity. The SIH claims that the primary distinction differentiating UAs from UEs is telicity. Among UAs, core and peripheral verbs, ranging from inherently telic to stative, are distinguished by degrees of telicity. Core UAs are

predicted as more compatible with PPPs than peripheral ones are. On the other hand, core UAs are assumed to be least possible with the *for hours* constructions among all the verb classes tested.

The findings in this experiment confirmed that Mandarin-speaking L2 learners can acquire the core-peripheral distinction as native English speakers do. Native speakers of English, as predicted, show a stronger preference to PPPs with core UAs, while they indicate a clear rejection of PPPs with peripheral UAs and UEs in general. L2 learners are more willing to accept PPPs with core UAs than with UEs. However, they still have problems in rejecting PPPs with UEs. L2 learners are less determinate in their judgments on PPPs with peripheral UAs and UEs in general. It should also be pointed out, nevertheless, that overall judgments on PPPs with core UAs are not completely acceptable, which is unexpected.

The unexpected performance on core UAs might be related to the task effect. As Levin & Rappaport Hovav (1995, p.14) mentioned, "the semantic properties of the verb may be a necessary, but not a sufficient, condition for passing an unaccusative diagnostic." Therefore, not all UAs are expected to pass all diagnostics of unaccusativity. PPPs are completely compatible with core UAs denoting change of location and state like *fallen leaves* and *decayed fish*. Some verbs like *arrive* and *appear*, however, can only occur prenominally with certain modifiers. Test sentences used in the study, however, did not use any modifiers with all UAs in order to balance the stimuli. For this reason, both native speakers of English and Mandarin-speaking learners did not accept PPPs with certain core UA verbs like *arrive* and *appear* in the experiment.

Further evidence for the core-peripheral distinction can also be gained from the results of

the *for hours* constructions. Native speakers of English tend to reject the *for hours* constructions with core UAs because telic verbs are incompatible the time duration adverbials. They accept peripheral UAs because most of the stative verbs tested in the study is compatible with the *for hours* constructions except "seem". They accepted all UEs in the *for hours* constructions, but rated the *for hours* constructions with core UEs more acceptable than with peripheral UEs. Semelfactive verbs like *jump* is controversial as to the degree of telicity. Some claim that they are basically telic (Rothstein, 2004), while others argue that they are basically atelic (Smith, 1991). *Jump*, as a peripheral UE verb used in the test, received a relatively lower scores in the *for hours* constructions than other manner of motion verbs like *run* and *swim*. Mandarin-speaking L2 learners tend to exhibit the same gradience in their judgments as native speakers do.

However, an unexpected finding in the *for hours* constructions is that L2 learners appear to be reluctant to accept UEs in the *for hours* constructions in general, while native speakers of English rated them with a strong preference. Contrary to what has been proposed in the literature, L2 learners, especially intermediate-level learners, show a reluctant acceptance of UEs in the construction. The results might be attributable to relative frequency of the *for hours* constructions used in different tenses. Following Baker (2018), all verbs tested were used in past tense with the *for hours* constructions, for the inherent telicity of some verbs can be overridden in certain contexts, as in (27c & d). Given that all sentences with the *for hours* constructions were used in past tense, L2 learners might have difficulty accepting them in past tense. In the context of this study, this cannot be more than a speculation because the experiment used did not test the *for hours* constructions with perfective and progressive tense. If L2 learners

indicate a stronger preference of UEs with perfective and progressive tense to past tense in the *for hours* constructions, we might predict that relative frequency plays a role in the L2 acquisition as well. I would like to leave this issue for future study.

(27). a. The boy has worked for hours on that problem.

b. The boy was working for hours on that problem.

c. *The guest arrived for hours.

d. The guests were arriving for hours.

The experimental results, overall, confirmed that Mandarin-speaking L2 learners of English can have a subtle knowledge of the semantic core-peripheral distinction, suggesting that the SIH tends to capture gradience of split intransitivity in general. Mandarin-speaking learners of English, consistent with previous studies of L2 learners of Romance languages (Sorace, 1993; 1995), were sensitive to the same hierarchy that is seen in Italian, German, Japanese (Sorace & Shomura, 2001).

As discussed in Section 3.4.1, English does not have categorical morphosyntactic markers that differentiate UAs from UEs as those auxiliary-selecting languages do. Moreover, syntactic diagnostics of split intransitivity consist of optional constructions allowed by one subtype. L1 transfer and L2 input alone appears not to be enough to facilitate the core-peripheral distinction. In this situation, what evidence might L2 learners rely on to acquire the core-peripheral distinction in their attempt to figure out the optionality in the input?

I hypothesize that Mandarin-speaking L2 learners would rely on semantic evidence, that is, L2 acquisition of English split intransitivity is lexically constrained. L2 learners rely greatly

on semantic evidence to acquire the *for hours* constructions. Telicity is an essential feature characteristic of UAs but not of UEs. Despite much positive input for UEs in the *for hours* constructions, L2 learners did not have a native-like judgment on UEs. However, they have acquired a native level judgment on UAs in general. Experimental results observed in the present study bears out the hypothesis as far as UAs are concerned. This study provides further evidence for the role of telicity in capturing gradience of split intransitivity.

The lexical-semantic features of particular verbs facilitate their classification as either UAs or UEs with certain syntactic configurations. Various theories about the interaction between lexical semantic properties of intransitive verbs and their argument structure have been developed in the past three decades. Taking the stand that the syntactic properties of verbs are determined by their meaning, they seek to identify the syntactically relevant lexical properties of verb meanings. The SIH, different from the projectionist approach on split intransitivity, argues that gradience on the SIH is a part of a speaker's knowledge, which is systematic and has been left unaccounted for by traditional linguistic interface models (Sorace, 2011).

The gradient approach claims that telicity and agentivity are two key factors "whose interaction affects the syntax of split intransitivity and creates gradient satisfaction of morphosyntactic diagnostics of split intransitivity" (Sorace, 2011, p. 69). She indicates that aspectual feature (telicity and atelicity) is the primary feature that classifies UA verbs into core and peripheral ones. As many researchers pointed out (Tenny, 1987, 1994; Borer, 2005), telicity is closely related with argument structure. The SIH argues that argument structure mapping can be determined by verbs that encode telicity to variable degrees.

Some theoretical proposals have also been proposed to account for the multiple mapping

between the lexical-semantic level and the syntactic level of split intransitivity. That is, why do core verbs have more consistent syntactic behaviors both within and across languages? Why do peripheral verbs show more variation in syntactic behaviors both within and across languages? According to Sorace (2004, 2011), there is no ideal theoretical account for 'the multiple mappings between the multidimensional lexical-semantic level and syntactic level of split intransitivity. A step in the right direction is the Template Augmentation hypothesis proposed by Rappaport Hovav & Levin (1998). In line with the conventional theory of predicate decomposition, they assume that "UG provides an inventory of lexical semantic templates consisting of various combinations of primitive predicates, which correspond to a large degree to the generally acknowledged event type" (Rappaport Hovav & Levin, 1998, p.107). They provide a potentially universal inventory of lexical semantic templates corresponding to the basic event types, as in (28).

(28). a. [x ACT ⟨*MANNER*⟩] (activity)

b. [x <*STATE*>] (state)

c. [BECOME [x ⟨ *STATE*⟩]] (achievement)

d. [[x ACT ⟨*MANNER*⟩] CAUSE [BECOME [y ⟨*STATE*⟩]]] (accomplishment)

e. [x CAUSE [BECOME [y ⟨*STATE*⟩]]] (accomplishment)

The event structure templates listed above is fixed but the constants italicized in the angled brackets are open-ended. The ontological type of constants can be a manner, state, place, thing, etc. (Jackendoff, 1990; Pinker, 1989). Each constant might be associated with a specific event structure template through canonical realization rules. The constant also determines the basic

number of participants in the event it is paired with. Take *swim* and *wipe* as examples. Although swimming and wiping are both activities, an event of swimming only involve a swimmer, while an event of wiping minimally includes a wiper and a surface because of the nature of wiping itself. The pairing of a constant with a particular event-structure template produces the basic meaning of verbs.

Derived verb meanings can also be created through adding simple event-structure templates into more complex one. Levin and Rappaport Hovav (1998) attribute derived verb meanings to Template Augmentation, which allows more complex event structure templates to be augmented on simpler ones in an incremental and monotonous fashion. Accomplishments that have a fully specified event-structure template cannot be augmented further, while achievements that have a simple event-structure template can be augmented only by adding a causing subevent. Stative verbs, with their less specified event structure, can be freely augmented to constitute more complex events. This suggests that stative verbs are more susceptible to variable syntactic behaviors. However, as Sorace (2004) suggests, a full explanation for the gradience requires a better understanding of the interplay between syntactic and lexical-semantic levels of split intransitivity. There seems to be no explanation that could do full justice to the pattern of variation represented by the SIH.

Although semantic evidence could facilitate L2 learners' acquisition of the core-peripheral distinction in English split intransitivity, the results also show that Mandarin-speaking L2 learners did not have target-like judgments on the core-peripheral distinction in PPPs and the *for hours* constructions in general. It seems that there are some other factors coming into play in addition to the semantic universals. As Sorace and Shomura (2001) suggested, "the

robustness and lack of ambiguity of the evidence for the distinction" also determine the ease or difficulty in the acquisition of split intransitivity. English does not present overt and unambiguous evidence for split intransitivity in the input. Therefore, L2 learners have protracted difficulty in learning exactly how the core-peripheral distinction is represented syntactically. The syntactic distinction underlying split intransitivity is acquired early and stable. The interface conditions determining gradience, in contrast, cause greater learning problem because they display more variation and instability.

3.2.3 Primacy of Core verbs in L2 Acquisition

The third research question investigated if core verbs have primacy in L2 acquisition of split intransitivity. Core verbs are predicted to be not only categorical and consistent in syntactic behavior across languages and within individual languages, but also elicit more determinacy of native speakers' intuitions and primacy in acquisition. Peripheral verbs, on the other hand, are subject to a degree of inconsistency and thus are delayed in acquisition (Keller and Sorace, 2003).

The experimental results provide an affirmative answer to the question as far as PPPs are concerned. Native English speakers have more determinate judgments on core UAs than on non-core UAs. That is, they accept core UAs and reject non-core ones in PPPs. Mandarin-speaking L2 learners of English are sensitive to the semantic core-peripheral distinction. They tend to accept core UAs in PPPs and reject non-core UAs in a reluctant way. Despite a non-target knowledge on the PPPs in general, Mandarin-speaking L2 learners have exhibited nativelike judgments on PPPs with core UAs. They, in contrast, differed significantly from

native English speakers in their judgments on peripheral UAs. Core UAs, therefore, have primacy in L2 acquisition of English split intransitivity, as predicted by the SIH.

The current findings provide further evidence for the cross-linguistic validity of the SIH. Previous studies on L2 acquisition of Italian, French, Spanish and Japanese (Sorace, 1993a; 1993b; Montrul, 2004; Sorace and Shomura, 2001) suggested that the developmental pattern of L2 acquisition of the syntactic diagnostics of split intransitivity in these languages are consistent with the gradient semantic-aspectual hierarchy captured by the SIH. Studies on L2 Italian found that auxiliary selection and *ne*-cliticization, as two main syntactic manifestations of the UA-UE distinction, are lexically constrained and tend to be acquired in a gradient way. Core UAs exhibiting more consistent syntactic behavior are acquired earlier than peripheral UAs exhibiting more variation. Sorace and Shomura (2001) observed a similar developmental pattern in the acquisition of quantifier floating in their study on L2 Japanese. Native speakers of Japanese have clearer and determinate judgments about the ungrammaticality of quantifier floating with core UEs. L2 learners did not exhibit the same gradience in their judgments as native speakers do, but they seem to develop in the same direction as native Japanese speakers do.

L2 acquisition of the syntactic manifestation of the UA-UE distinction in languages without overt morphosyntactic markers is more difficult than in languages with a clear morphosyntactic marker. English, similar to Japanese, offers less consistent and unambiguous evidence for the syntactic UA-UE distinction. PPPs, as a syntactic diagnostic of split intransitivity, consist of optional constructions allowed mainly by core UAs. Mandarin-speaking L2 learners in the present study are also found to be conditioned by the SIH in their

acquisition of PPPs, starting with core UAs and gradually spreading to the peripheral UAs. Given that Mand arin, like English, is a language that lacks an overt and systematic evidence for the UA-UE distinction. Mandarin does not have an identical structure to English PPPs. The V-*DE* structure shares certain similarity with English PPPs, but the V-*DE* structure in Mandarin does not serve as a syntactic manifestation for the UA-UE distinction. Instead, both UA and UE verbs are possible with the construction. Therefore, the knowledge on the core verbs in PPPs should not be attributable to L1 transfer. It is lexical-semantic features of verbs that facilitate the L2 acquisition of syntactic manifestations of the UA-UE distinction.

The results observed from the *for hours* constructions are hard to interpret. Recall that the *for hours* constructions are assumed to be least compatible with core UAs but compatible with both non-core UAs and UEs in general. Native speakers of English are on the whole more willing to accept UEs and atelic peripheral UAs, as expected. Mandarin-speaking L2 learners of English exhibit a similar pattern in judgments on core and non-core UAs. There is no significant difference found between native speakers of English and L2 learners in their judgments on UA subtype.

Though L2 learners have exhibited native-level judgments on both core and peripheral UAs, a slight difference in *p* value suggests that peripheral UAs are acquired earlier than the peripheral ones in the *for hours* constructions. As Figure 3.19 in Section 3.3.2 suggests, L2 learners in this study might have acquired the non-core UAs first in the *for hours* constructions, for the mean acceptance score of non-core UAs is nearly the same as that of native speakers. The mean acceptance score of advanced level learners and native speakers converges to a great extent, while intermediate-level learners diverge slightly on core UA verbs from the other two

groups.

The results from the *for hours* constructions are contradictory to what is predicted, which might be attributable to a lack of negative evidence. As mentioned in Section 3.4.2, the ease or difficulty in L2 acquisition of split intransitivity is mainly determined by two factors. One is the interplay of semantic features and syntactic configurations. The other is the robustness and consistency of the syntactic evidence for the UA-UE distinction in L2 input. Since most core telic verbs are incompatible with the *for hours* constructions, L2 learners cannot encounter enough input in either classroom setting or in natural setting. Peripheral UAs, being stative, is claimed to be possible with the *for hours* constructions. L2 learners are presented with more positive evidence with peripheral UA verbs in the *for hours* constructions than with core UAs. In this situation, peripheral UAs have primacy in L2 acquisition of the *for hours* constructions. L2 acquisition of telic core verbs in the *for hours* constructions, on the contrary, impose greater learning problems. First, there is no negative evidence for the unacceptability of the core telic verbs in the *for hours* constructions. In the absence of negative evidence, L2 learners do not have a clear indication that they are disallowed.

What's more, L2 input is not consistent and unambiguous. Core UAs include two subclasses: verbs of change of location and verbs of change of state. Verbs of change of location have the highest degree dynamicity and telicity. Telic verbs are aspectually incompatible with durative time adverbials. However, telic verbs become compatible with the *for hours* constructions if used in a progressive tense or with plural subjects. Verbs of change of state usually express a change of state without specifying a telic endpoint. Some verbs like *decay* is possible with the *for hours* constructions. For Mandarin-speaking L2 learners of English, what

they encounter in the L2 input is not consistent and undermined to a certain extent. Finally, L1 transfer does not help L2 learners much. Both UAs and UEs are assumed to be compatible with durative time adverbials in Mandarin. Core UAs are equally compatible with the durative time adverbials as peripheral UAs in Mandarin. Mandarin-speaking L2 learners, therefore, have to resort to semantic features for the knowledge.

Core UAs have primacy in L2 acquisition of PPPs, while peripheral UAs have primacy in L2 acquisition of the *for hours* constructions. Though the SIH predicts that L2 learners would rely on semantic evidence in L2 acquisition of split intransitivity, the robust and consistent L2 input also plays a role in determining how rapid and efficient they acquired a native level knowledge. Core UAs tend to be acquired earlier than peripheral UAs in PPPs when the L2 input presents positive evidence for L2 learners. However, when the L2 input provides neither positive or negative evidence, L2 learners would rely more on semantic features of verbs that could facilitate L2 acquisition of split intransitivity. This could explain why L2 learners could approximate a nativelike knowledge on core UAs in the *for hours* constructions despite a poverty of stimulus.

The overall results of the present study on two diagnostics of split intransitivity, however, cannot tell whether Mandarin-speaking learners of English can eventually internalize the optionality in their interlanguage grammars and have a nativelike knowledge on the gradient hierarchy represented by the SIH. More learner groups, especially more advanced and near-native learners, are needed to see if the ultimate attainment of split intransitivity can be achieved or not.

3.5 Summary

To summarize, the present study presents results of an experimental investigation into the acquisition of the syntactic UA-UE distinction and semantic core-peripheral distinction in English split intransitivity. The main purpose is to investigate whether Mandarin-speaking L2 learners of English exhibit sensitivity to the UA-UE distinction, but also to an aspectual and thematic hierarchy that underlies the core-peripheral distinction similarly to L2 learners of Romance languages who were found to be influenced by the SIH (Sorace, 2000, 2004, 2011). The SIH maintains that core verbs are more consistent with unaccusative diagnostics while peripheral verbs exhibit gradience to varying degrees. Two diagnostics of split intransitivity, PPPs and the *for hours* constructions, were used to test native English speakers and Mandarin-speaking L2 learners' gradient acceptability with respect to core-peripheral verb classes. The results show that both native speakers and nonnative speakers of English are not only sensitive to the UA-UE distinction, but also sensitive to the core-peripheral distinction in PPPs and the *for hours* constructions. Core UA verbs tend to be acquired earlier than peripheral ones in PPPs, but peripheral UAs have primacy in L2 acquisition of the *for hours* constructions. These findings give further support for the direct access to semantic universals in L2 acquisition of the syntax of split intransitivity.

Chapter 4 Telicity and Animacy Effects on the Overpassivization Tendency of Intransitive Verbs

4.1 Introduction

In the previous Chapter, an experimental investigation of the core-peripheral distinction in the two syntactic diagnostics of split intransitivity was presented. The results indicate that the L2 acquisition of the syntactic manifestations of split intransitivity is constrained by the SIH. It is indicated that telicity is the primary factor that distinguishes core UAs from peripheral ones. The SIH suggests that split intransitivity is a gradient phenomenon, in terms of the likelihood and consistency of a verb mapping onto the argument structure that determines unaccusativity or unergativity. The mapping relations between lexical properties of verbs and split intransitivity are predictable in that whereas core verbs project consistently onto one type of argument structure, peripheral verbs project onto both types of argument structure to varying degrees.

As I mentioned in Section 2.4, the phenomenon of overpassivization in L2 acquisition is always assumed to be evidence for the UA-UE distinction. UAs and UEs are claimed to be represented differently in L2 learners' interlanguage grammars. Studies based on L2 learners' production data have found that L2 learners appear to overextend the passive morphology to a subtype of intransitive verbs, namely, UA verbs (Zobl, 1989; Oshita, 1997, 2001). Previous works also indicate that phenomenon seems to be universal to learners of different L1 backgrounds, including Thai, Korean, Chinese, Japanese, Arabic, German and Spanish (Balcom,

1997; Chung, 2014; Hirakawa, 2001; Ju, 2000; Kondo, 2005; Oshita, 2000; Yip, 1995; Zobl, 1989).

Different hypotheses have been proposed, but the results of some similar studies remain divided and even conflicting. The Postverbal NP Movement Hypothesis proposes that L2 learners treat UAs as passives because both constructions have an internal argument that is an underlying object moving to the subject position. It claims that passive UAs result from learners' misguided attempt to overgeneralize the morphosyntactic properties of the English passive construction to UA verbs. Yip (1990, 1995), however, rejects the view that UAs are underlyingly represented as passives, so that the passive UAs are produced by syntactic movement from passives. Instead, she hypothesizes that L2 learners treat UAs as transitive verbs because only transitive verbs allow passivization in English. Oshita (2000), based on the data selected from Longman Learners Corpus, in turn, rejects Yip's Transitivization Hypothesis, and claims that UAs are more passivized than they are transitivized. Ju (2000), administering a forced-choice task, proposes that causation types play a role in English L2 overpassivization tendency. L2 learners are more likely to make overpassivization errors with UAs in externally caused events than in internally caused events. The hypothesis in turn was refuted by Kondo (2005), who argues that UAs in externally caused events are not more likely to be passivized than UAs in internally caused events.

Recently, L2 researchers become more interested in between-verb differences in the tendency of overpassivization of intransitive verbs. Ju (1997) first reports that there is a discrepancy among UAs in terms of rejection rates on ungrammaticalized passivized UAs. Syntactic accounts such as the Postverbal NP Movement Hypothesis and the Transitivization

Hypothesis argue that passive UAs are caused by syntactic movement, but the between-verb variations in terms of susceptibility to the overpassivization errors suggest that there might be some other factors underlying overpassivization errors. Ju (2000) examines whether a non-grammatical factor such as conceptualizable agents affects the overpassivization tendency of Mandarin-speaking L2 learners. Through a forced-choice task, she finds that L1 Mandarin learners passivize UAs more frequently in externally caused events than in internally caused events. She maintains that it is comparatively easier to conceptualize an agent or causer in externally caused contexts, for L2 learners are less willing to believe that any change of state happens spontaneously or without external causation. Though she also hypothesizes that alternating UAs which are inherently causative are more likely to be passivized than non-alternating UAs describing internally caused events, the experimental results did not support her hypothesis.

Chung (2014), following Ju (2000), conducted a forced-choice elicitation task and argues that causation types and animacy types play significant roles in the tendency of overpassivization of alternating and non-alternating UAs. In line with Ju (2000), Chung (2014) finds that Chinese and Korean L2 learners had lower correct response rates on verbs in an externally caused event than those in an internally caused event. Furthermore, L2 learners, regardless of their L1s, made more errors with verbs with non-animate subjects compared to animate subjects. However, she indicates that while Korean learners made more errors with alternating UAs than with non-alternating UAs, Chinese learners did not show any significant difference between them. She suggests that the difference between the two L1 groups comes from L1 transfer since Korea has overt markers for the causative alternation while Chinese like

English has zero morphological marker for the causative alternation. She further argues that telicity, which underlies the SIH (Unaccusative Hierarchy in her paper), plays no role in accounting for the different overpassivization rates between alternating and non-alternating UAs because Chinese learners did not make more errors with alternating UAs than with non-alternating ones. Though the role of the SIH effect was rejected in accounting for the differences, it should be noted that the SIH does not include alternating UAs with transitive variants in the hierarchy because they are weak in unaccusativity and exhibit UE behaviors in some languages (see Sorace, 2000 on French; Haegeman, 1994 on English).

Yusa (2003), adopting a grammaticality judgment test, examines whether Japanese L2 learners' tendency to reject passive forms of non-alternating UAs are subject to the prediction by the SIH. The results show that Japanese learners incorrectly accepted core telic UAs significantly more often than atelic UAs, and passive UEs were more rejected than telic and atelic UAs, suggesting that L2 learners are sensitive to the SIH. He proposes that passive UAs is a reflex of auxiliary selection in Romance languages. The auxiliary *be* tends to occur with telic UAs in auxiliary-selecting languages. Hirakawa (2006) conducted a similar grammaticality judgment test on non-alternating UAs. Four verb categories were selected including telic (core) UAs, atelic (non-core) UAs, uncontrolled (non-core) UEs and controlled (core) UEs. Each category was represented by three verbs, and each test item was presented with two sentences, one providing a priming context and the other listing a target sentence in either an acceptable intransitive form or an unacceptable passive form. The results, however, suggest that Japanese L2 learners' judgments on passive core UAs and noncore UAs are not significantly different. Instead, core UEs are found to be least passivized by Japanese L2

learners. It remains controversial if L2 learners would make more overpassivization errors with core telic UAs than with atelic UAs, and if the tendency of overpassivization of intransitive verbs is subject to the SIH.

To date, previous studies on overpassivization mainly focused on UAs, especially on the between-verb differences between alternating and non-alternating UAs. The results of the two studies (Hirakawa, 2006; Yusa, 2003) which dealt with the between-verb differences of non-alternating verbs conflict with each other. Yusa (2003) claims that Japanese L2 learners' sensitivity to the ungrammaticality of passive UAs and UEs conform to the SIH, and they incorrectly accept *be* for core UAs more than atelic UAs and UEs. Hirakawa (2006), on the contrary, argues that the results obtained in her experiment appear to be inconsistent with the SIH. The reason lying behind the conflicting results might be due to the task designs, both of which did not manipulate the causation type and subject animacy, and learners in their studies were not matched at proficiency level. It remains unknown if there is any significant difference between core and peripheral UAs in terms of the tendency of overpassivization, and if animacy will cause greater problems for core UEs than peripheral UEs given the fact that agentivity is a primary feature of UEs. Thus, the present study aims to examine telicity and animacy effects in the overpassivization tendency of intransitive verbs by answering the following three research questions.

1. Are core telic UAs more likely to be passivized than peripheral atelic UAs?
2. Are core UEs more affected by the animacy of the argument of verbs than peripheral UEs?
3. Are core UEs least likely to be passivized among all the verb types?

If Ju (2000) and Chung (2014) is correct in assuming that it is easier to conceptualize an agent for UAs in externally caused events than in internally caused events, it could be predicted that UAs are more likely to be passivized in externally caused events than in internally caused events. Furthermore, Ju (2000) suggests that the availability of agents is evoked by the verb meaning and causation types, it could be predicted that core telic verbs are more likely to be influenced by causation types than peripheral UAs since core UAs generally denote telic change and peripheral UAs are typically statives. That is, core UAs are more likely to be passivized than non-core ones in externally caused events. Therefore, for the first research question, the hypothesis could be proposed as follows.

Hypothesis I

> L2 learners will make more overpassivization errors with UAs in externally caused contexts than in internally caused contexts. L2 learners will also be more likely to overpassivize telic UAs than peripheral UAs in externally caused contexts.

Previous studies like Chung (2014) suggests that animacy influences the overpassivization tendency of UAs, and L2 learners are more likely to passivize UAs with an inanimate subject than with an animate subject. As proficiency increases, L2 learners tend to overcome the animacy effects on UAs. In addition, animacy has always been associated closely with thematic roles, voice and argument structure (Ferreita, 1994; Grimshaw, 1990; Tomlin, 1983; Swart, Lamers and Lestrade, 2008). There is a lack of studies examining the role of animacy effects on UEs. According to the SIH, agentivity is a primary feature for UEs with core UEs being more agentive than non-core ones. Agentive verbs typically require an animate entity as subject. If the SIH is cross-linguistically plausible, the animacy of the verb's argument should affect the

overpassivization of core UEs more than peripheral ones. Therefore, the following hypothesis is proposed to answer the second question.

Hypothesis II

> L2 learners would make less overpassivization errors with core UEs when the subject is animate, but they would make more errors with core UEs when the subject is inanimate.

It has also been observed that L2 learners have no problems with UEs in general. However, Hirakawa (2006) finds out that L2 learners are likely to have difficulty in rejecting passive non-core UEs. The syntactic account such as the Postverbal NP Movement Hypothesis seldom predicts that UEs should cause a problem for L2 learners. In other words, if L2 learners observe the UA-UE distinction in their interlanguage grammars, they know the differences of the underlying argument structures of UAs and UEs and they are expected to overextend the passive morphology only to UAs but not to UEs. If UEs are greatly influenced by animacy effects than UAs as indicted in Vernice and Sorace (2018), the following hypothesis could be proposed.

Hypothesis III

> The overpassivization tendency of UEs depends greatly on the animacy of verb argument. Core UEs will be least likely to be passivized among all the verb types when the subject is animate, while when the subject is inanimate, they will also cause problems for L2 learners.

4.2 Methodology

4.2.1 Participants

A total of 90 participants took part in the experiment. All the participants were recruited in China, consisting of high school (12^{th} grade) students and university students majoring in

English. The mean age of the high school students at the time of testing was 17.54, ranging from 17 to 18. The mean age of the university students was 20.45, ranging from 18 to 23. All the participants started to learn English as a foreign language in China, and they have never been to English-speaking countries. Following Chung (2014), I classified the L2 participants into different levels of proficiency by having them take a proficiency test (Quick placement test [QPT], 2001). The QPT test has a maximum score of 60, containing 60 questions assessing reading, vocabulary and grammar. Their proficiency levels were then compared with the Association of Language Testers in Europe levels and divided accordingly. This resulted in three groups, a lower-intermediate level learner group (henceforth Group 1), an upper-intermediate level learner group (henceforth Group 2) and an advanced level learner group (henceforth Group 3). The background information of the L2 participants and their respective levels are listed in Table 4.1, and the one-way ANOVA indicates the QPT scores between the three groups of learners are statistically significant (F (2, 89) = 344.45, p < .001).

Table 4.1 Participants' background information and proficiency scores

	Group 1 (N=30)		Group 2 (N=30)		Group 3 (N=30)	
	Mean	SD	Mean	SD	Mean	SD
Age at testing	17.54	0.51	19.06	0.91	21.86	0.60
QPT scores	35.20	3.29	41.51	1.74	50.05	1.85

4.2.2 Task

There are two tests designed for this experiment, a proficiency test and a forced-choice elicitation task. The proficiency tests were given to all the L2 participants immediately after

they took the forced-choice elicitation task. As mentioned earlier, Yusa (2003) and Hirakawa (2006) hold different claims as to the role of the SIH effect in accounting for the overpassivization tendency of intransitive verbs. One possibility is that the variables of causation types and the animacy of verb argument are not controlled. Therefore, following Ju (2000) and Chung (2014), I select the forced-choice task for the present study to control the causation type of the priming sentence and the animacy of the verb argument in the target sentence. All the participants were asked to read a pair of sentences comprising a priming sentence setting up the context for the event (internally caused event or externally caused event), as in (29a), and a target sentence, as in (29b). The target sentence was presented in either active or passive form, and L2 learners were asked to choose the grammatical form for the target sentence.

(29) a. The cage is too big.

b. The rabbit (escaped/was escaped) easily.

The forced-choice elicitation task was chosen over the grammaticality judgment test for two reasons. Firstly, the purpose of the study is not to test L2 learner's competence on the (un)grammaticality of passive intransitives but to examine the factors influencing L2 learners' tendency to overpassivize intransitive verbs. Secondly, the grammaticality of certain sentences is hard to judge without contexts. That is, different sentences have different levels of acceptability in different contexts. Take the following sentence as an example.

(30)The clothes were dried.

The sentence (30) is completely acceptable out of text. It has a stative reading indicating the state of the clothes. It also has a passive reading suggesting that the clothes were dried by someone or a dryer. If in the context of (31a), the sentence is unacceptable. However, it becomes felicitous in the context of (31b).

(31) a. *After the rain stopped, the clothes were dried gradually.

b. After the rain stopped, the clothes were dried by the staff.

To conclude, the forced-choice task served the purpose of this study better than the grammaticality judgment task.

4.2.3. Materials and Design

In order to compare the overpassivization tendency between core and non-core verbs, I used the 6 UAs in Chung's (2014) study, which all belong to the category of core UAs. 18 more intransitive verbs were chosen to balance verb types and SIH types. A total of 24 verbs were evenly divided by their intransitive type (12 UAs and 12 UEs) and the SIH type: half of those intransitive type verbs were core, and the other half non-core. Verbs were classified as core or non-core/peripheral on the basis of their semantic features proposed by the SIH hypothesis: core UAs were telic verbs of change of location and change of state, while non-core or peripheral UAs were verbs of continuation of state and existence of state; core UE verbs were ones denoting controlled non-motional processes, whereas non-core UE verbs were ones either denoting controlled motional processes or uncontrolled processes. The verbs selected in the present study are given in Table 4.2.

Table 4.2 Intransitive verbs used in the experiment

Core UA verbs	*arrive, die, vanish, disappear, emerge, appear*
Peripheral/non-core UA verbs	*stay, stand, seem, remain, exist, sit*
Peripheral/non-core UE verbs	*cough, sneeze, tremble, swim, run, sleep*
Core UE verbs	*play, work, sing, cry, shout, laugh*

We also checked the frequency of the selected verbs in the present as well as the past tense, to ensure that none were used predominantly in one tense or the other, which could potentially skew the results. Information on the frequency of individual verbs was obtained from the corpus of the English Lexicon Project. The English Lexicon Project, supported by the National Science Foundation, affords access to a large set of lexical characteristics, along with behavioral data from visual lexical decision and naming studies of 40,481 words and 40,481 nonwords. Table 4.3 and 4.4 present the data of the frequency of the selected verbs in their past tense and present tense respectively.

Table 4.3 Frequency of verbs in the past tense

core UAs	frequency	peripheral UAs	frequency	core UEs	frequency	peripheral UEs	frequency
arrived	38.22	stayed	32.71	played	56.27	coughed	0.59
died	157.22	remained	4.37	worked	115.24	sneezed	1.25
disappeared	28.8	sat	28.61	sang	8.22	trembled	0.41
vanished	5.55	stood	25.78	cried	12.98	ran	84.24
appeared	9.78	existed	7.96	shouted	2.25	swam	2.41
emerged	1.47	seemed	54.25	laughed	10.69	slept	35.49

Table 4.4 Frequency of verbs in the present tense

core UAs	frequency	peripheral UAs	frequency	core UEs	frequency	peripheral UEs	frequency
arrive	18.69	stay	515.65	play	354.53	cough	8.78
die	261.14	remain	33.22	work	798.02	sneeze	2.94
disappear	20.96	sit	311.35	sing	97.59	tremble	2.24
vanish	3.20	stand	226.20	cry	65.65	run	350.55
appear	23.37	exist	28.96	shout	16.45	swim	31.80
emerge	1.73	seem	139.82	laugh	62.86	sleep	227.94

As for the verb frequency in the past tense, the core UAs (Mean = 40.17, SD = 59.08) are slightly more frequent than non-core UAs (Mean = 25.61, SD = 18.12); Core UEs (Mean = 34.28, SD = 44.17) are more frequent than non-core UEs (Mean = 20.73, SD = 34.01). The one-way ANOVA test revealed the overall lexical frequency of the four verb classes was not significantly different (F (3, 23) = 0.262, p = 0.852). As for the verb frequency in the present tense, core UAs (Mean = 54.85, SD = 101.48) are less frequent than peripheral UAs (Mean = 209.20, SD = 185.96); Core UEs (Mean = 232.52, SD = 302.60) are slightly more frequent than non-core UEs (Mean = 150. 15, SD = 200.05). The one-way ANOVA showed that there is no significant difference among the four verb classes, F (3, 23) =1.085, p = 0.378).

Each test item is made up of two parts: the first part functions as a priming sentence to create a context for the event in the second sentence, which is either externally caused, as in (32a), or internally caused, as in (32b); the second part is the target sentence with a forced choice between an active and passive voice, as in (32a-b), which are adapted from (Ju, 2000, p. 96). In (32a), the priming sentence sets up a context in which it is easier to assume that the

event of *The package disappeared immediately* is brought about by some external force, while in (32b), the priming sentence sets up a context in which the agent is less salient and not apparent. According to Ju (2000) and Chung (2014), L2 learners are more likely to make errors with UAs in externally caused events in which an agent or causer is conceptually available. Following Ju (2000), adverbials such as *quickly*, *gradually* and *immediately* were added to the target sentences to allow only passive readings instead of stative ones, as in (32 a-b). Through adding adverbials with aspectual information for the predicate, the target sentences are not interpreted as statives.

(32) a. The police were called in to remove a strange package.

The package (disappeared/was disappeared) immediately.

b. A car slid off the road and a package fell from the car into the lake.

The package (disappeared/was disappeared) immediately.

Furthermore, the animacy of subject arguments was also manipulated to examine degrees of agentivity encoded by the core and peripheral verb classes. Animate subjects include animals and people, and non-animate subjects include inanimate substances like *cars*, *rocks* and *books*. Thus, each verb was used in four conditions with regard to causation types and animacy types, as in (33). Examples are adapted from Chung (2014, p. 70).

(33) a. The boy lifted the dog out of the blanket. (externally caused)

The dog (appeared / was appeared) slowly. (animate subject)

b. The boy pulled the toy car out of the sand. (externally caused)

The car (appeared / was appeared) slowly. (inanimate subject)

c. It was a very foggy morning. (internally caused)

Some people (appeared / were appeared) slowly in the distance. (animate subject)

d. It was a very foggy morning. (internally caused)

Some houses (appeared / were appeared) slowly as we drove along. (inanimate subject)

Each verb was used in four conditions in terms of the animacy of verb argument (animate/inanimate) and causation types (externally caused events/internally caused event). Each verb can be either core or peripheral, and thus eight conditions were created for the UA verbs, as shown in (34). Similarly, UEs (core/non-core) were also used in the identical 8 conditions. The examples in (34-37) demonstrate the four conditions of a core/non-core UA and UE verb. The complete set of experimental sentences are presented in Appendix B.

Core UAs

(34) a. The magician did a trick with a rabbit. (externally caused)

The rabbit (vanished/was vanished) instantly. (animate subject)

b. The magician did a trick with a coin. (externally caused)

The coin (vanished/was vanished) instantly. (inanimate subject)

c. A fish jumped in the water. (internally caused)

The fish (vanished/was vanished) instantly. (animate subject)

d. A coin fell into the water. (internally caused)

The coin (vanished/was vanished) instantly. (inanimate subject)

Peripheral UAs

(35) a. Someone locked the door suddenly. (externally caused)

Three men still (remained/were remained) inside the room. (animate subject)

b. Someone turned off the light suddenly. (externally caused)

The house (remained/was remained) dark for a while. (inanimate subject)

c. The man was sick. (internally caused)

He (remained/was remained) in the hospital for three days. (animate subject)

d. The book was on the table. (internally caused)

It (remained/was remained) there for days. (inanimate subject)

Core UEs

(36) a. The girl was invited to perform for the president. (externally caused)

She (sang/was sung) beautifully. (animate subject)

b. The drug dealer shot at him. (externally caused)

The bullets (sang/was sung) past his ears. (inanimate subject)

c. The girl was 11 years old. (internally caused)

She (sang/was sung) beautifully. (animate subject)

d. It was dark in the forest. (internally caused)

Bullets (sang/were sung) past the soldiers' ears. (inanimate subject)

Peripheral UEs

(37) a. The policeman went after the thief. (externally caused)

The thief (ran/was run) fast. (animate subject)

b. The man was attacked. (externally caused)

Blood (ran/was run) down his face slowly. (inanimate subject)

c. The man was an athlete. (internally caused)

He (ran/was run) fast. (animate subject)

d. The man lost consciousness. (internally caused)

Blood (ran/was run) down his face slowly. (inanimate subject)

In addition, to make sure that every participant knows the correct usage of passive forms, 20 transitive verbs were selected to create 20 test items in which the passive voice was preferred, as illustrated in (38). I adopted all the 20 distractors listed in Chung's (2014) study. The distractors served as a pretest to examine L2 learners' knowledge on passive rules. Only data from those participants with four errors (out of 20 items) or less were included for the final analyses.

(38) Tom had a party. Many people (invited/were invited) to the party.

Thus, with the 24 verbs used in the four different conditions, 96 test items were created. There are 140 sentences all together including 96 test items and 44 fillers (20 distractors and 24 fillers). All the test items were randomized so that each participant reads the 140 sentences in different orders.

4.2.4 Procedure and Scoring

All the L2 participants were asked to take the test in a classroom setting. Participants received both written and oral instructions. L2 participants were given the test on paper where detailed instructions were given in Mandarin in advance to make sure the participants would understand the requirements. When taking the tests, the participants were neither allowed to consult dictionaries or any other reference books, nor were they allowed to return to the previous pages to refer back to a sentence with the same verb. It took about 20-30 minutes to complete the task. Ten native English speakers also took the test as a control group, and they converged on all sentences except two sentences used with the core UE verb *play*. Therefore, all the data related to *play* were deleted from the final analyses.

Following Chung (2014), the results are reported in terms of the correct response rate. If a participant gave correct answers to all the questions for each condition of each variable, then s/he got a score of 1, and if a participant answered all the questions incorrectly, s/he received a score of 0. If a participant answered half of the questions correctly, then s/he received a score of 0.5 points. The correct response rate can be easily calculated to the overpassivization rate because a test item has only two choices. Thus, a correct response rate of 0.85 means that the

overpassivization error rate is 0.15. The higher the correct response rate is, the lower the overpassivization error rate is.

4.3. Results

This section presents the results of all the L2 participants' choice on the test items. Out of 35 lower-intermediate level learners, five were eliminated because of the high error rates on distractors (more than 5 errors). High error rates on distractors mean that they did not know the passive rules well enough. One learner was excluded from the upper-intermediate group for the same reason. Data from 3 advanced learners were eliminated due to incomplete answers. Thus, the following analyses were based on 90 L2 participants (Group 1(N= 30), Group 2 (N=30), Group 3 (N= 30)). A four-way repeated measures ANOVA was performed on UAs and UEs separately. For both verb types (UAs/UEs), independent variables are SIH types (core/non-core), causation types (externally caused/internally caused), animacy types (animate/inanimate) and proficiency groups (Group 1, Group 2, Group 3), and the dependent variable is the correct response rate.

4.3.1 Results for UA Verbs

The overall results for UAs are reported in terms of the mean correct response rate. The mean correct response rate of the three groups by condition and proficiency level are listed in Table 4.5. Table 4.5 presents the mean correct response rate for the 8 conditions of UAs from the lowest to the highest. As can be seen in the table 4.5, the most difficult condition for L2 participants is telic core UAs with an inanimate subject in an externally caused context. The two most difficult conditions contain core UAs. On the other hand, the easiest condition for L2

learners, as predicted, is non-core UAs with animate subjects in internally caused events.

Table 4.5 Correct response rates by condition and proficiency level

Rank	Condition	Group 1	Group 2	Group 3	Mean
1	Core UAs in externally caused events with inanimate subjects	0.61	0.77	0.98	0.79
2	Core UAs in externally caused events with animate subjects	0.78	0.87	0.99	0.88
3	Core UAs in internally caused events with inanimate subjects	0.72	0.93	0.99	0.88
4	Non-core UAs in externally caused events with inanimate subjects	0.76	0.89	0.99	0.88
5	Non-core UAs in internally caused events with inanimate subjects	0.77	0.91	0.99	0.89
6	Non-core UAs in externally caused events with animate subjects	0.84	0.92	0.99	0.92
7	Core UAs in internally caused events with animate subjects	0.84	0.94	0.98	0.92
8	Non-core UAs in internally caused events with animate subjects	0.87	0.96	0.99	0.94

Figure 4.1 shows that the general pattern for lower-intermediate learners are quite consistent in that core UAs had a lower correct response rate than peripheral ones in the four conditions. Core UAs had the lowest correct response rate when the condition is externally caused and the subject is inanimate. They had the highest correct response rate when the condition is internally caused and the subject is animate. It seems that the tendency to passivize core and peripheral verbs varies with respect to causation types and the animacy of the subject.

Figure 4.1 Group 1: Mean correct response rates for core and non-core UAs by causation types and animacy types

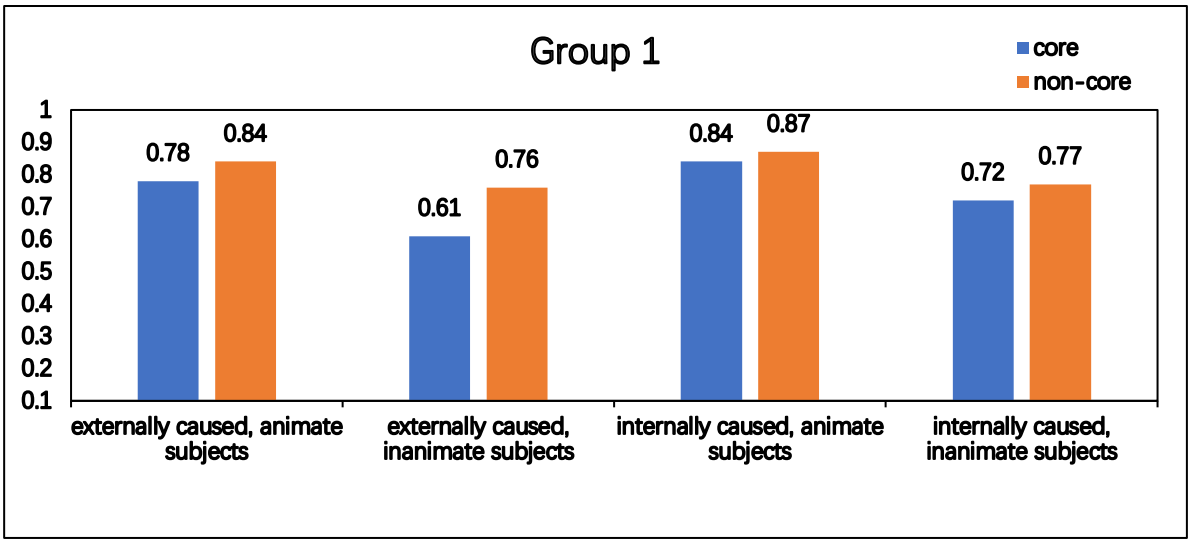


Figure 4.2 presents a different pattern from Figure 4.1. Upper-intermediate learners in Group 2 were more accurate to choose the correct forms for the target sentences. They are still more likely to passivize core UA verbs than peripheral ones in an externally caused event. However, when core UA verbs appear with an internally caused event, there is no striking difference between core and non-core verbs. What's interesting in Group 2 is that the correct response rate for core UAs in internally caused events with inanimate subjects is higher than that for core UAs in externally caused events with animate subjects. That means that as proficiency increases, UA verbs are less influenced by the animacy of verb arguments when there is no external cause. The correct response rate for UA verbs is still influenced by the animacy of subjects when the event is externally caused, indicating by the lower correct response rate for UAs in externally caused events with inanimate subjects than that for UAs in externally caused events with animate subjects.

Figure 4.2 Group 2: Mean correct response rates for core and non-core UAs by causation types and animacy types

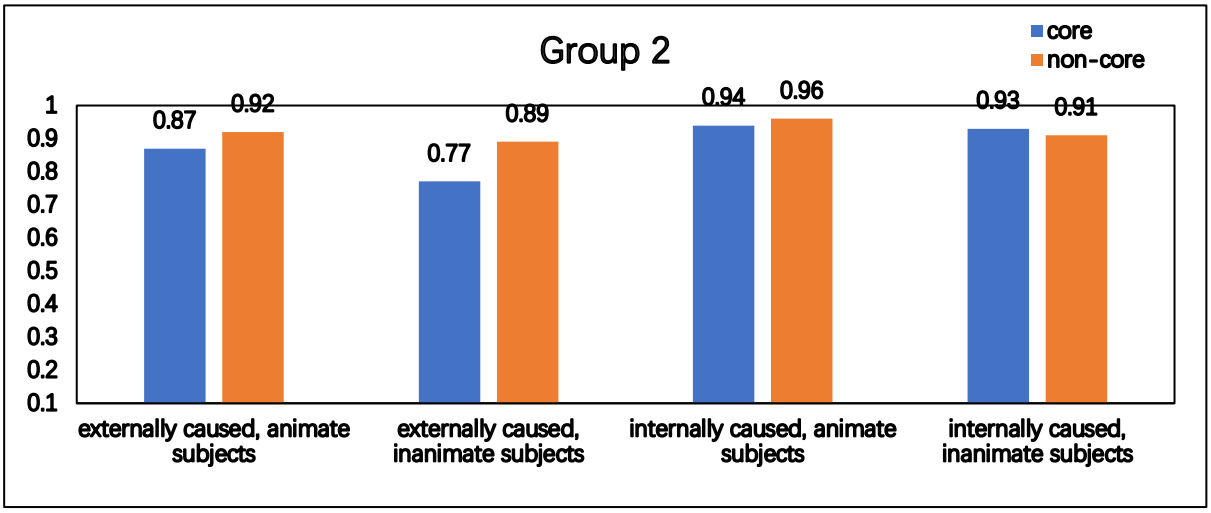
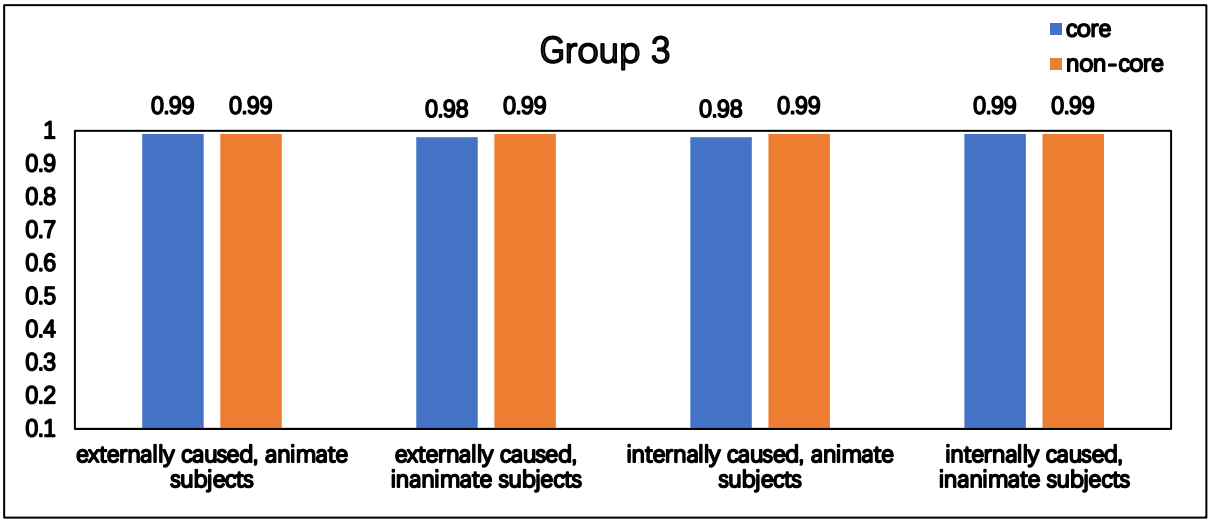


Figure 4.3 indicates that the mean correct response rates of advanced learners are almost nativelike in all the four conditions. There is no difference between core and non-core UAs by causation types and animacy types.

Figure 4.3 Group 3: Mean correct response rates for core and peripheral UAs by causation types and animacy types



The results were submitted to a four-way mixed ANOVA, with groups as the between-subject factor, with SIH types, causation types, and animacy types as the within-subject factors

and the mean correct response rate as the only dependent variable.

Table 4.6 presents the main effects for groups, SIH types, causation types, the animacy of verb arguments and their interaction effects.

Table 4.6 Effects of groups, SIH types, Causation types, animacy types, and interactions

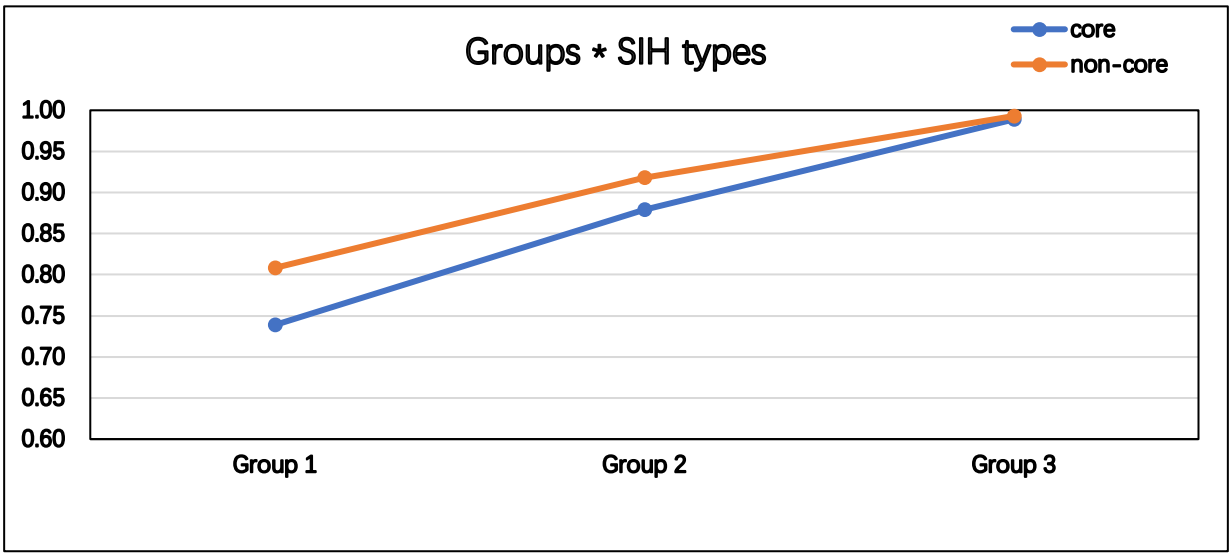
Variables and interactions		*F*	Sig.
Between-subject factor	Groups	40.76	.000
Within-subject factors	SIH types	8.72	.004
	Causation types	20.70	.000
	Animacy	34.43	.000
Interactions	Animacy * Groups	14.56	.000
	SIH type * Groups	2.21	.116
	Causation types * Groups	4.63	.012
	SIH types * causation types	8.30	.005
	SIH types * causation types * animacy	6. 45	.013

As shown in Table 4.6, three groups differed significantly in their correct responses rates regarding causation types, animacy types and SIH types. There is also a significant interaction between groups and causation types ($p = 0.012$) and animacy types ($p < 0.001$), a marginal significant interaction between groups and SIH types ($p = 0.085$). Once significant interactions were found, specific contrasts using paired-samples *t*-tests were examined further. The relevant interaction effects are reported in order.

The ANOVA shows that the main effect of SIH types is significant, F (1, 87) = 8.72, p = 0.004, suggesting that the mean correct response rate for core UAs is significantly lower than

that for non-core UAs. That is, core UAs, as predicted, are more likely to be passivized than peripheral UAs by L2 learners. There is no significant interaction effect between SIH types and groups, F (2, 87) = 2.205, p = .116, indicating that the mean correct response rate difference for core and peripheral UAs is similar across groups. Figure 4.4 presents the mean correct response rates of core and peripheral UAs among the three groups.

Figure 4.4 Correct response rates for SIH types (core/non-core UAs) by proficiency level



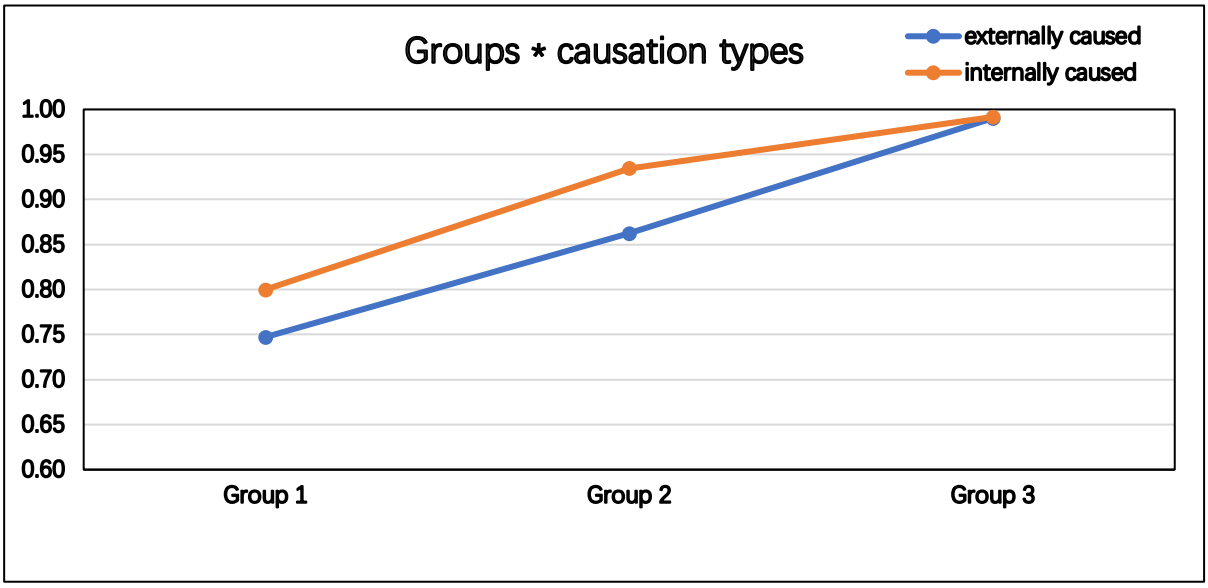
More specifically, core UAs are more likely to be passivized than non-core ones in both Group 1, t (29) = -2.129, p = 0.042, and Group 2, t (29) = -2.059, p = 0.049. A separate ANOVA for Group 1 and Group 2 revealed that core UAs are more likely to be passivized than peripheral UAs in a similar pattern, F (1, 58) = 0.655, p = .422. Group 3, in contrast, acquired native-like knowledge of UAs. Core UAs are not more likely to be passivized than non-core UAs by Group 3 learners, t (29) = -.828, p = .415.

The ANOVA revealed a significant main effect of causation types, F (1, 87) = 20.70, p < 0.001, with UAs in externally caused events are more likely to be passivized than ones in

internally caused events, and a significant interaction between causation types and groups, F (2, 87) = 5.207, p = 0.007, suggesting that the mean correct response rates between externally caused and internally caused events varied according to the proficiency level.

Figure 4.5 shows the interaction effect between causation types and groups. Group 1 rated sentences in internally caused events more accurately than ones in externally caused events, t (29) = -2.357, p = 0.025, so did Group 2, t (29) = - 4.239, p < 0.001. A separate ANOVA for Group 1 and Group 2 indicated that L2 learners in both groups were more likely to passivize sentences in externally caused events than ones in internally caused events in a similar way, F (1, 62) = 0.507, p = .479. Group 3, on the contrary, did not have higher correct response rates on sentences between externally and internally caused events, t (29) = -0.273, p = 0.787.

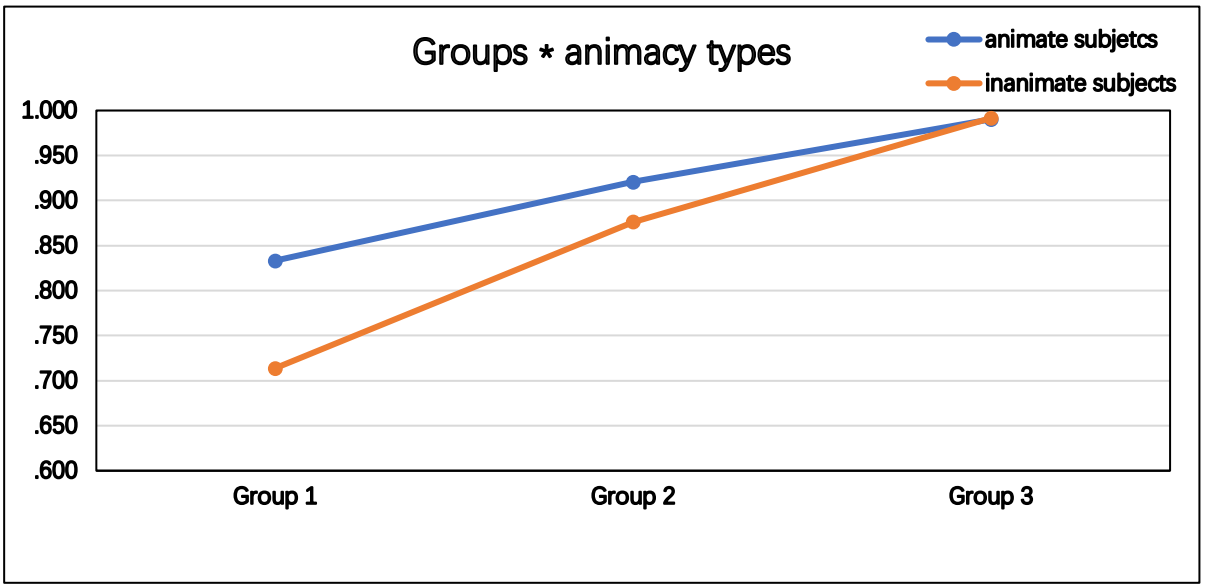
Figure 4.5 Correct response rates for causation types by proficiency level



The ANOVA test also yielded a main effect of animacy types, F (1, 87) = 34.43, p < 0.001, suggesting that verbs with inanimate subjects are more likely to be passivized than those with animate subjects. As can be seen in Figure 4.6, a significant interaction between proficiency

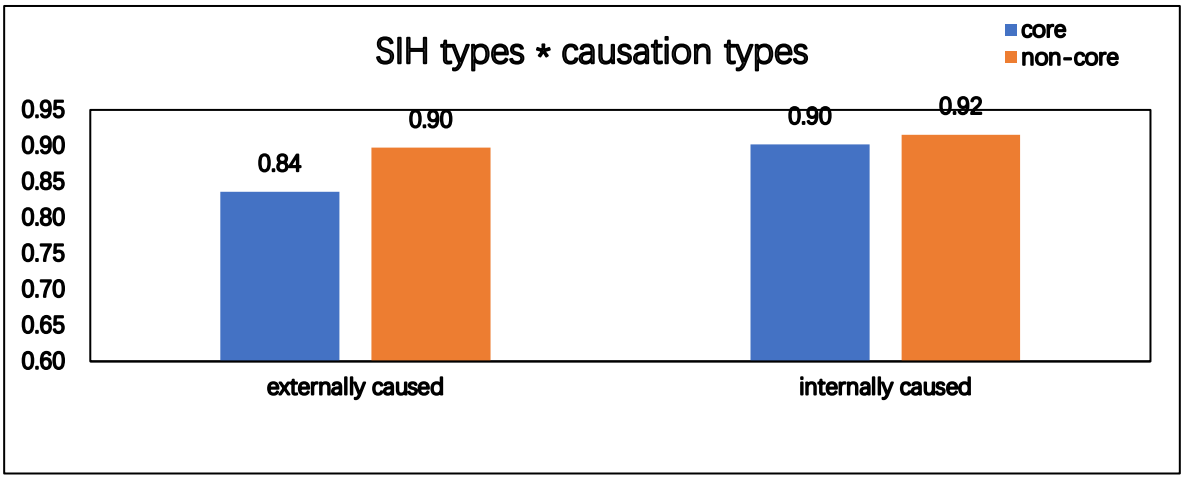
level and animacy types was obtained, F (2, 87) = 14.57, $p < 0.001$, indicating that the correct response rate between animate and inanimate sentences differed according to the proficiency level. Group 1 and Group 2 learners had a higher correct response rate for UAs with animate subjects than with inanimate subjects, t (29) = 4.972, $p < 0.001$, and t (29) = 3.431, $p = 0.002$ respectively. Advanced learners of Group 3, however, did not differ in the tendency to overpassivize UAs with animate and inanimate subjects.

Figure 4.6 Correct response rates for animacy types by proficiency level



The ANOVA indicated that there is a two-way interaction between causation types and SIH types, as shown in Figure 4.8. Core UAs are more likely to be passivized than non-core ones in externally caused contexts, t (89) = -3.615, p <.001, while core UAs are not more likely to be passivized than non-core UAs in internally caused contexts, t (89) = -1.023, p= .309.

Figure 4.7 The interaction effect between causation types and SIH types



Interestingly, the ANOVA also indicated that there is a three-way interaction among SIH types, causation types and animacy types, F (1, 87) = 6.45, p = 0.013, suggesting that the interaction effect between causation types and SIH types varies with the animacy of subject, as Figure 4.8 and 4.9 show.

Figure 4.8 The interaction effect between causation types and SIH types when subjects are animate

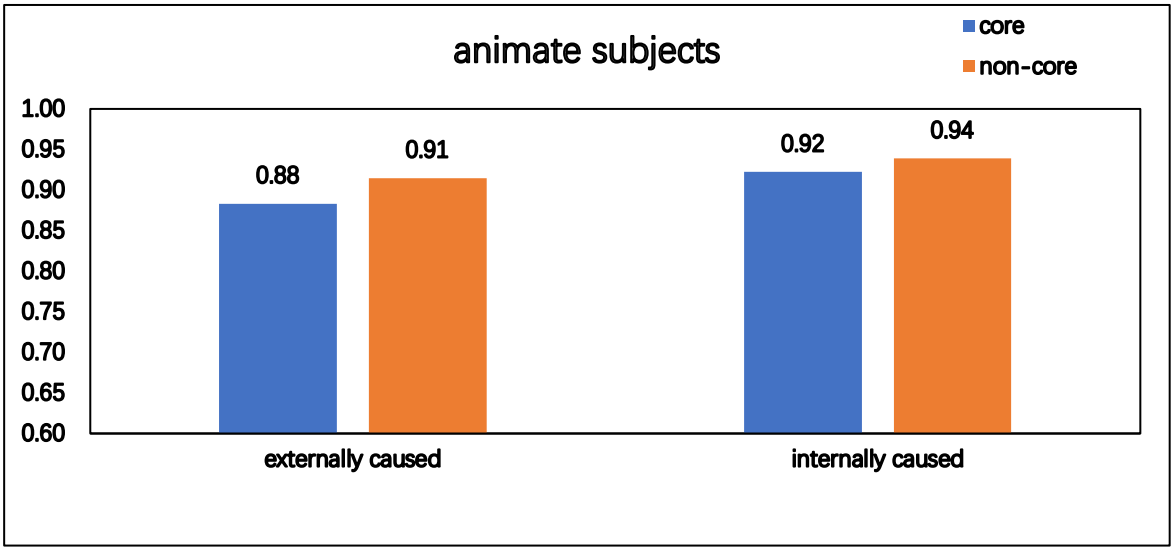
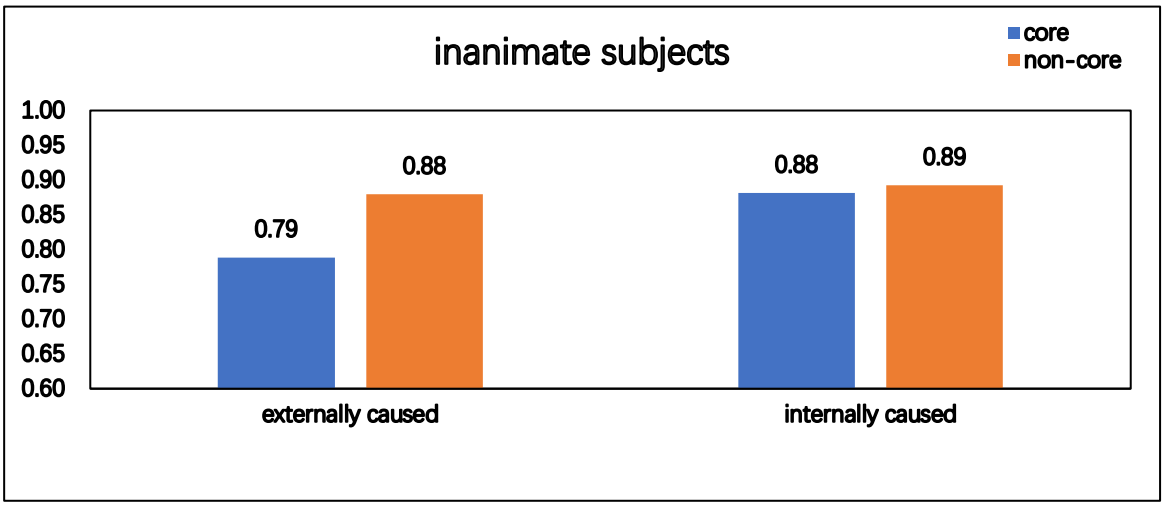


Figure 4.9 The interaction effect between causation types and SIH types when subjects are inanimate



When the subject is animate, there is no significant differences between core and peripheral UAs in both externally caused events, t (89) = -1.628, p = .107, and internally caused events, t (89) = -1.069, p = .288. In other words, core UAs are not more likely to be passivized than peripheral ones when used with animate subjects. However, when the subject is inanimate, core UAs are more likely to be passivized than non-core UAs in externally caused events, t (89) = -4.301, p < .001, but they are not more likely to be passivized than non-core UAs in internally caused events, t (95) = -.669, p =. 505.

To summarize, SIH types, causation types, animacy types and proficiency levels all influence L2 learners' tendency to over-passivize intransitive verbs. Specifically, Group 3 learners are already nativelike in selecting the correct form for the target sentences, suggesting that they accepted the grammatical UAs in the canonical subject-verb order. Lower proficiency level learners have problems with UAs and tend to passivize them under certain conditions. The most difficult condition for UAs in general for Group 1 and Group 2 is when the priming context is externally caused and the subject of target sentences is non-animate, while the easiest

condition for these two groups is when the priming context is internally caused and the target sentence subject is animate. Core UAs are more likely to be passivized than non-core ones only in externally caused contexts when used with inanimate subjects.

4.3.2 Results for UE Verbs

The mean correct response rates for UEs of the three groups by condition and proficiency level are listed in Table 4.7.

Table 4.7 Correct response rates by condition and proficiency level

Rank	Condition	Group 1	Group 2	Group 3	Mean
1	Core UEs in internally caused events with inanimate subjects	0.70	0.80	0.91	0.80
2	Core UEs in externally caused events with inanimate subjects	0.71	0.85	0.94	0.83
3	Non-core UEs in externally caused events with inanimate subjects	0.79	0.87	0.97	0.88
4	Non-core UEs in internally caused events with inanimate subjects	0.78	0.89	0.97	0.88
5	Non-core UEs in externally caused events with animate subjects	0.87	0.91	0.99	0.92
6	Non-core UEs in internally caused events with animate subjects	0.87	0.93	0.99	0.93
7	Core UEs in externally caused events with animate subjects	0.92	0.99	1.00	0.97
8	Core UEs in internally caused events with animate subjects	0.98	1.00	1.00	0.99

Table 4.7 presents the mean correct response rate from the lowest to the highest for UEs with the 8 conditions. As can be seen in Table 4.6, the most difficult condition for L2 participants is core UEs with an inanimate subject in an internally caused event. The least difficult condition is core UEs with an animate subject in an internally caused context. The pattern with UEs is quite clear because UEs with non-animate subjects are more likely to passivized than those with animate subjects.

The correct response rates of Group 1 are presented in Figure 4.10. It shows that core UEs are least likely to be passivized in a situation when subjects are animate in internally caused events. Core UEs are more likely to be passivized than non-core ones when the subjects are non-animate irrespective of the causation types.

Figure 4.10 Group 1: Correct response rates for core and peripheral UEs by causation types and animacy types

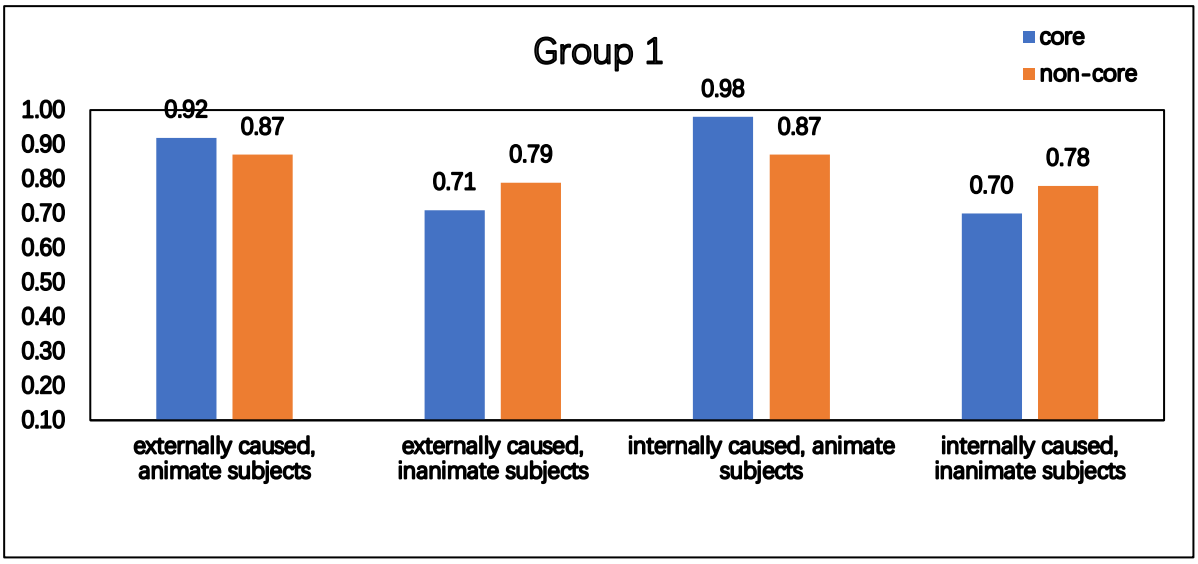


Figure 4.11 shows that Group 2 has a similar pattern as Group 1. In both externally caused and internally caused events, core UEs are more likely to be passivized than peripheral ones when used with inanimate subjects. When subjects are animate, core UEs have the highest

correct response rates.

Figure 4.11 Group 2: Correct response rates for core and peripheral UEs by causation types and animacy types

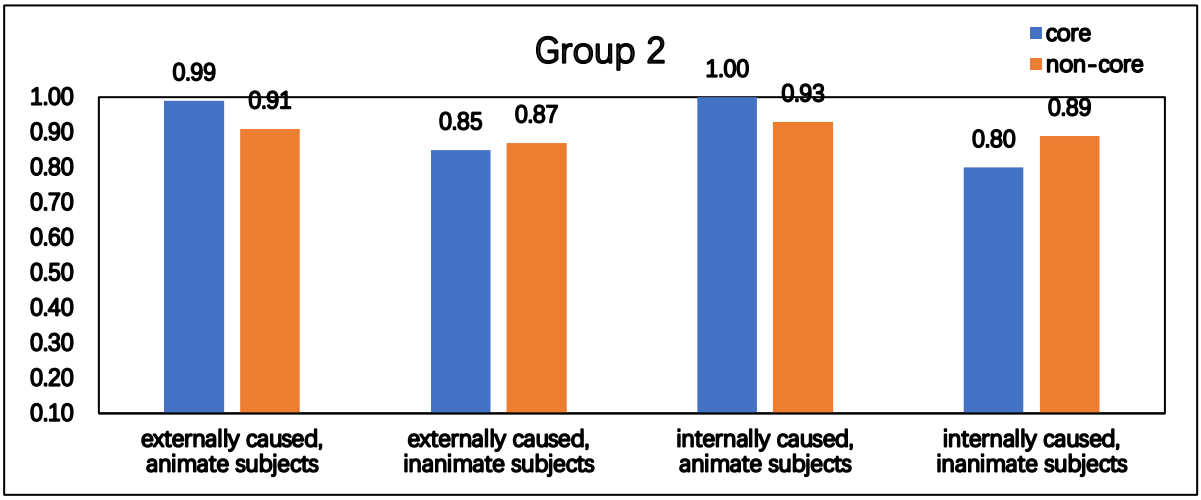
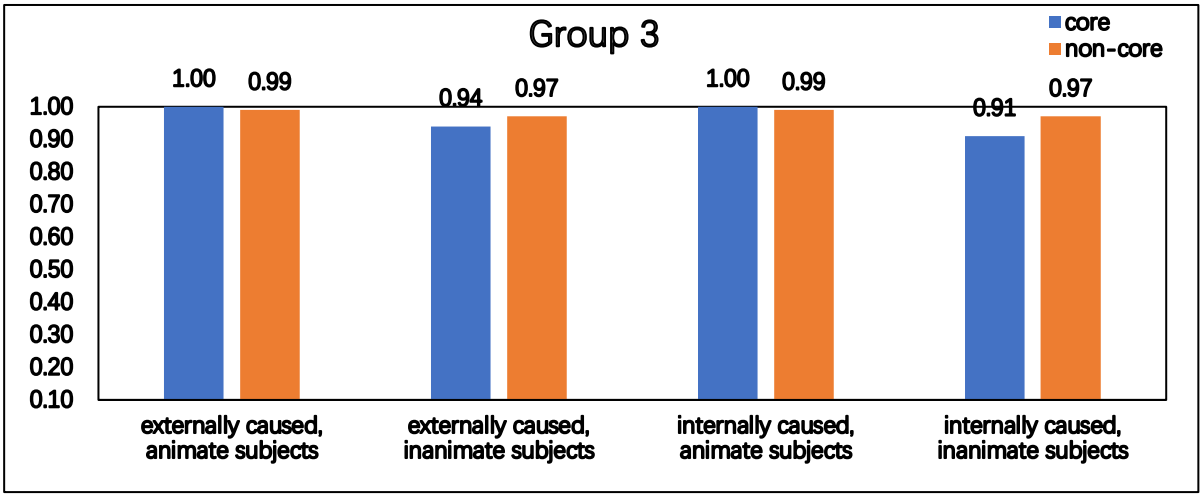


Figure 4.12 indicates that as proficiency increases, both core and peripheral UEs have the highest correct response rates when subjects are animate.

Figure 4.12 Group 3: Correct response rates for core and peripheral UEs by causation types and animacy types



The overall results were also submitted to a four-way mixed ANOVA; with groups as the between-subject factor, with SIH types, causation types, and animacy types as the within-

subject factors and the mean correct response rate as the only dependent variable. Table 4.8 presents the main effects of SIH types, causation types and animacy types, and their interaction effects. The ANOVA revealed that there is a main effect of animacy types, F (1, 87) = 99.21, p < .001, and groups, F (1, 87) = 20.48, p < .001, but no main effect of SIH types (F (1, 87) = 0.049, p = 0.825) and causation types (F (1, 87) = 0.046, p = 0.830). The relevant interaction effects are reported in order.

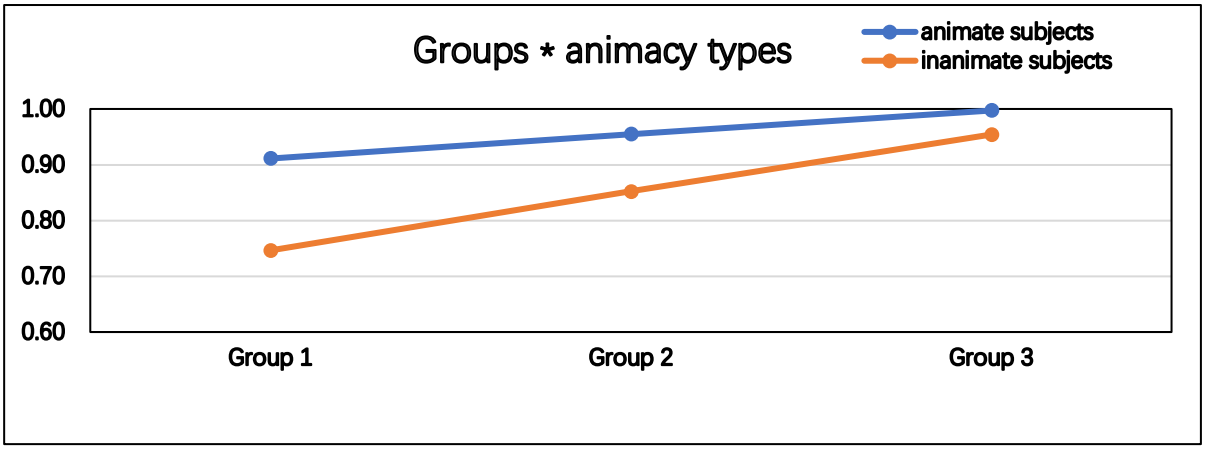
Table 4.8 Effects of groups, SIH types, causation types, animacy types, their interactions

Variables and interactions		*F*	Sig. (*p*)
Between-subject factor	Groups	20.48	.000
Within-subject factors	Animacy types	99.21	.000
Interactions	Animacy types * groups	11.40	.000
	SIH types * animacy types	41.90	.000
	SIH types* animacy types * groups	4.24	.018

The results show that there is a significant interaction between groups and animacy types, F (2, 87) = 11.40, p < 0.001, suggesting that the mean correct response rates between animate and inanimate sentences varied according to the proficiency level, as shown in Figure 4.13. That is, for Group 1 learners, UEs with non-animate subjects are more likely to be passivized than UEs with animate ones, t (29) = 6.579, p < .001. Group 2 exhibited a similar pattern that UEs are more likely to be passivized with inanimate subjects than with animate subjects, t (29) = 6.575, p < .001. UEs with inanimate subjects are still more likely to be passivized in Group 3 but to a lesser degree, t (29) = 4.284, p < .001. As proficiency increases, the correct response

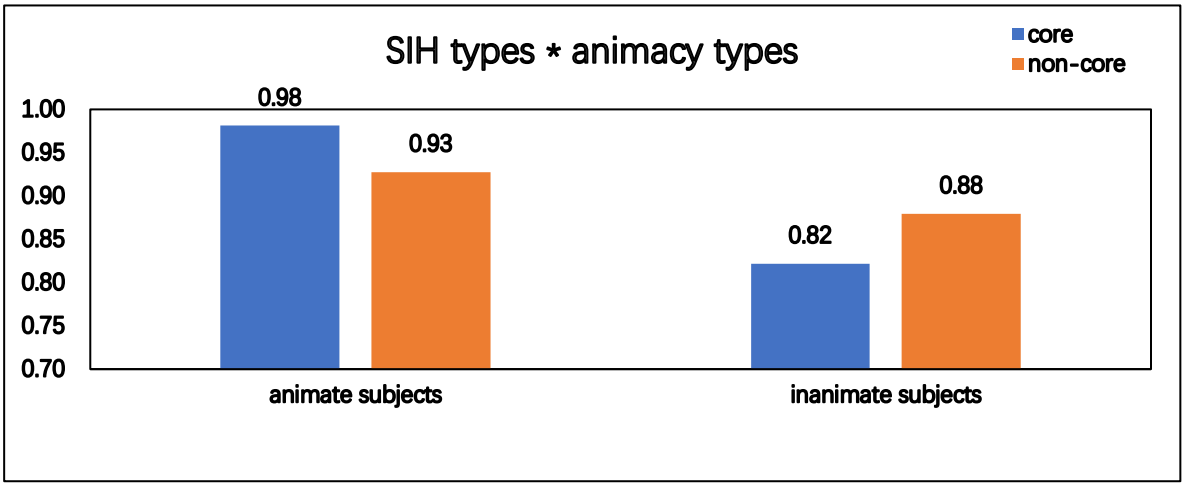
rate difference between UEs with animate and inanimate subjects becomes smaller.

Figure 4.13 Correct response rates for animacy types by proficiency level



The ANOVA indicates that animacy types interacted significantly with the SIH types, F (1, 87) = 41.90, p < .001. The two-way interaction, shown in Figure 4.14, indicates that when the subjects are animate, core UEs are less likely to be passivized than peripheral UEs, t (89) = 5.227, p <.001. On the contrary, when the subjects are inanimate, core UEs are more likely to be passivized than non-core ones, t (89) = -3.747, p <.001. The results suggest that core UEs are more influenced by the animacy of subjects than peripheral UEs.

Figure 4.14 The interaction effect between animacy types and SIH types



The ANOVA also revealed that there is a three-way interaction among animacy types, SIH types, and groups, F (2, 87) = 4.238, p = .018, suggesting that the correct response rates for core and peripheral UEs with animate and inanimate subjects differed among the three groups. The interaction effect between animacy types and SIH types was therefore compared across groups. The pattern between animacy types and SIH types holds for both Group 1 and Group 2, as illustrated in Figure 4.15 and 4.16.

Figure 4.15 The interaction effect between animacy types and SIH types for Group 1

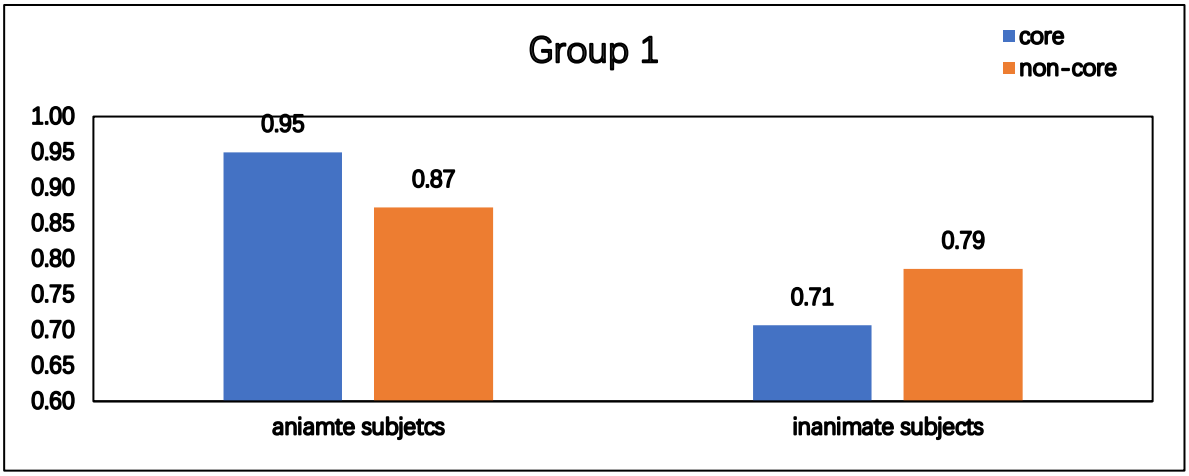
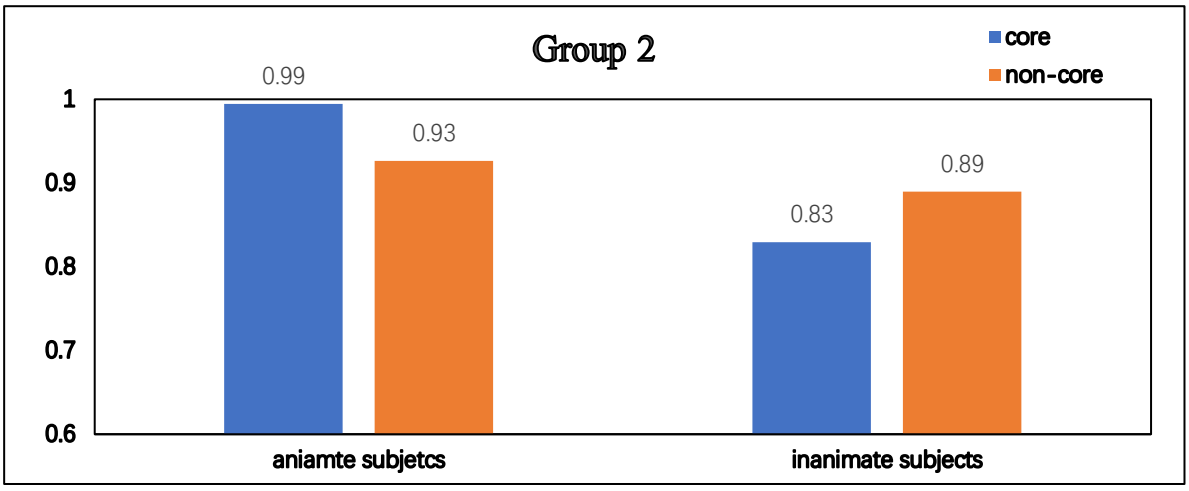


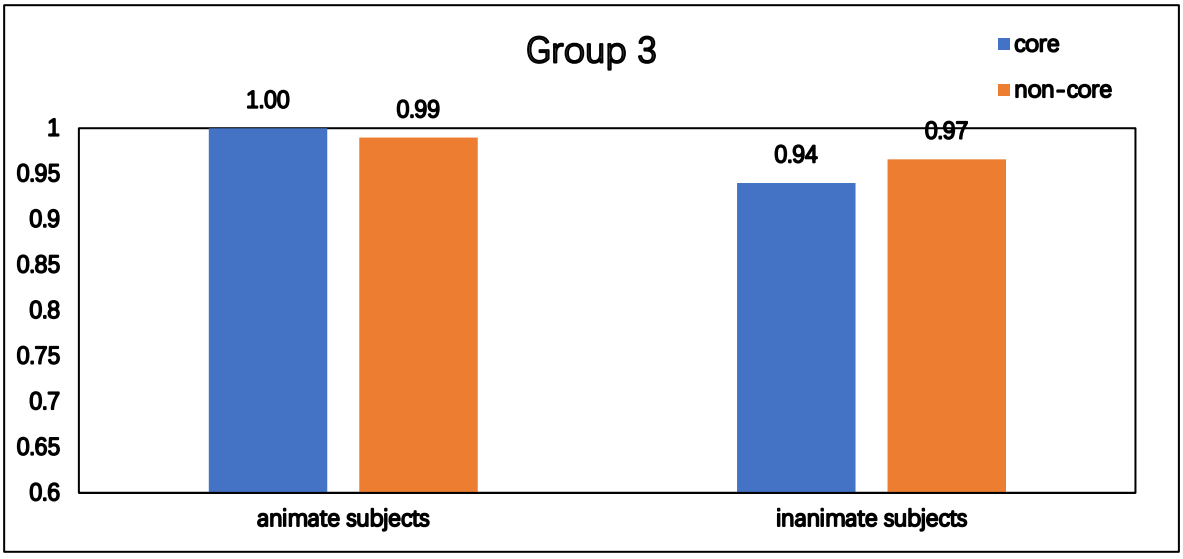
Figure 4.16 The interaction effect between animacy types and SIH types for Group 2



As shown in Figure 4.15 and 4. 16, L2 learners in both Group 1 and Group 2 had higher correct response rates for core UEs with animate subjects, whereas they had lower correct response rates for them with inanimate subjects. Core UEs are less likely to be passivized with animate subjects in Group 1, t (29) = 3.069, p = .001, and Group 2, t (29) = 4.189, p < .001, while they are more likely to be passivized with non-animate subjects, t (29) = -2.418, p = .022 and t (29) = -2.148, p = .040 respectively. A separate ANOVA for Group 1 and Group 2 further indicated that L2 learners of the two groups show the same tendency to passivize core UEs more than non-core ones when the subjects are inanimate, F (1, 58) = .251, p = .618.

However, core UEs are not more likely to be passivized than non-core ones with inanimate subjects in Group 3, as Figure 4.17 suggests. Advanced L2 learners did not make errors with core and con-core UEs when the sentence subjects are animate, t (29) = 1.439, p = .161. Core UEs are more likely to be passivized than non-core ones with inanimate subjcts, but not statistically significant, t (29) = -1.891, p = .069.

Figure 4.17 The interaction effect between animacy types and SIH types for Group 3



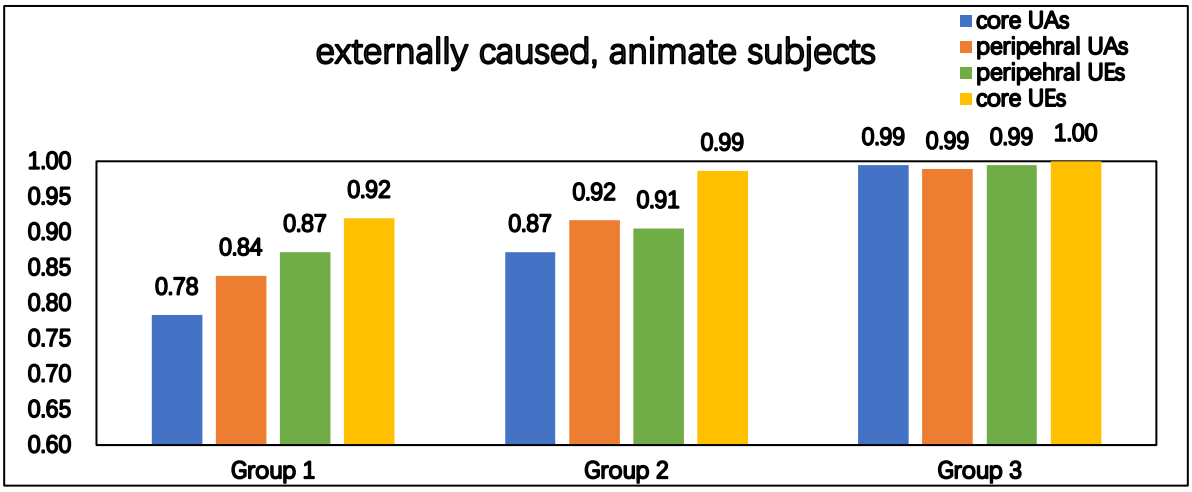
To conclude, both animacy types and SIH types influence L2 learners' overpssivization tendency of UEs. When the target sentence subject is animate, core UEs had a higher correct response rate than non-core ones. On the contrary, when the target sentence subject is inanimate, core UEs are more likely to be passivized than non-core ones. Group 1 and Group 2 learners tend to exhibit a similar pattern, while Group 3 did not.

4.3.3 Results for UAs and UEs

To examine if core UEs are least likely to be passivized as predicted by the SIH, data with core UAs, peripheral UAs, core UEs and peripheral UEs across different conditions are analyzed. The results of sepatate analyses on UAs and UEs show that multiple factors are influencing the overpassivization tendency of intransitive verbs. Therefore, the data of the four verb types are comapred from the four different conditions.

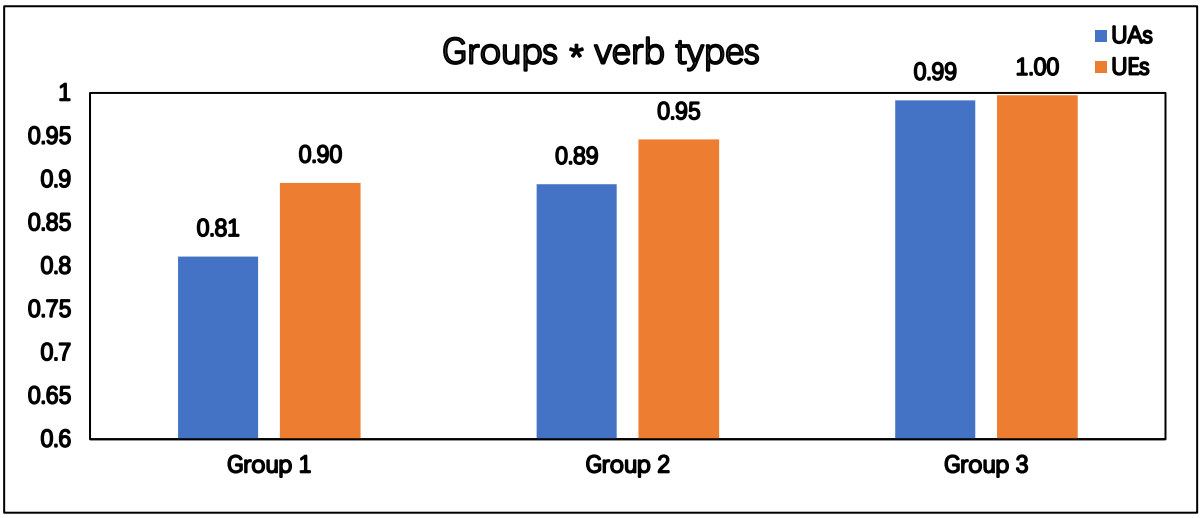
Figure 4.18 presents the mean correct response rates for the four verb types across three groups when the priming sentece is an externally caused context, and the target sentence has an animate subject. Group 1 exhibited a pattern predicted by the SIH. That is, L2 learners made most errors with core UAs and least errors with core UEs among all the verb types. It also seems that L2 learners made more errors with peripheral UAs than with peripheral UEs and core UEs. Group 2 and Group 1 demonstrated a similar pattern in that core UAs are more likely to be passivized, and core UEs are least likely to be passivized. But peripehral UAs are not more likely to be passivized than UEs. The pattern exhibited by Group 3 learners is not consistent with the SIH.

Figure 4.18 Mean correct response rates for the four verb types by groups



An ANONA for the four verb types with the first condition revealed that there is a main effect of verb types, F (1, 87) = 23.32, p < .001, indicating that UAs are significatly more likely to be passivized than UEs. However, the difference between UAs and UEs varied with groups, F (2, 87) = 5.27, p = .007. Figure 4.19 shows the interaction effect between verb types and groups. Group 1 learners made more errors with UAs than with UEs, t (29) = - 4.267, p < .001. Group 2 also made more errors with UAs than with UEs, t (29) = -2.362, p = .025. Group 3, however, did not make more errors with UAs than with UEs, t (29) = -.441, p = .662.

Figure 4.19 The interaction effect between groups and verb types



The ANOVA produced no main effect of SIH types, F (1, 87) = .284, p < .595, but there is a marginal significant interation effect among verb types, SIH types and groups, F (2, 87) = 3.199, p = .046, suggesting that the difference between core and peripehral UAs and UEs differed among all the three groups. Figure 4. 20 graphs the inetration effect between verb types and SIH types for Group 1. Paired-samples tests further suggested that the correct resposne rates between core and peripeheral UAs were not significantly different, t (29) = -1. 204, p = .238, nor were the correct response rates between core and non-core UEs, t (29) = 1.620, p = .116. As can be seen in Figure 4.21, Group 2 learners made more errors with peripheral UEs than with core UEs, t (29) = 3. 180, p = .003, but the mean correct response rates between core and non-core UAs are not different significantly, t (29) = -1.313, p = .199.

Figure 4.20 Group 1: The interaction effect between verb types and SIH types

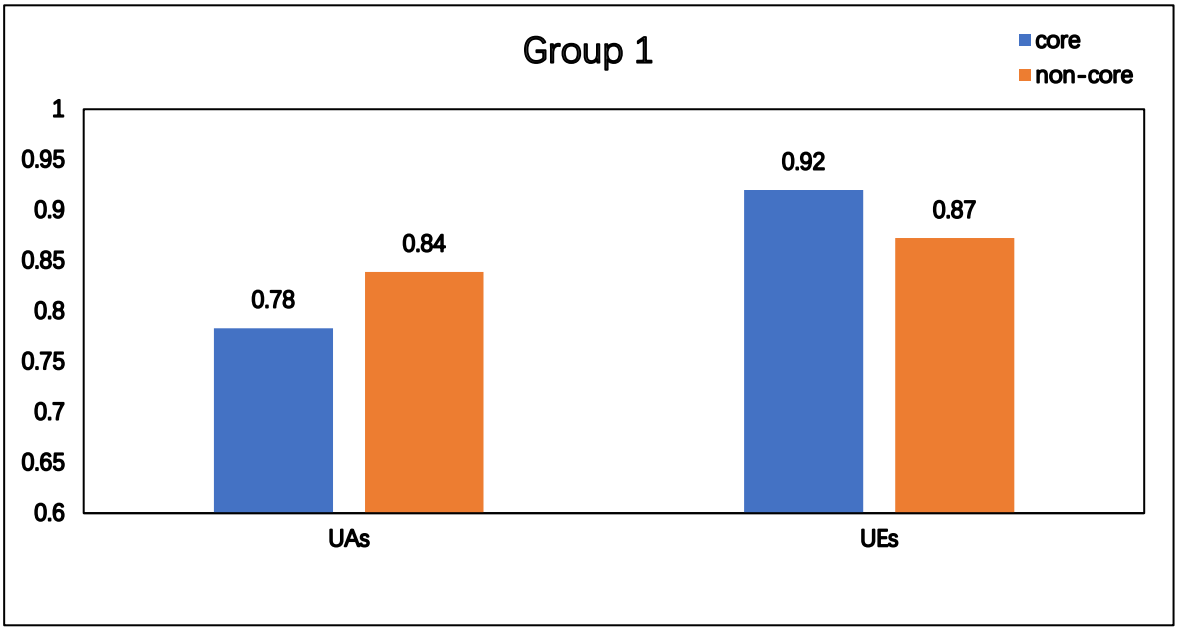
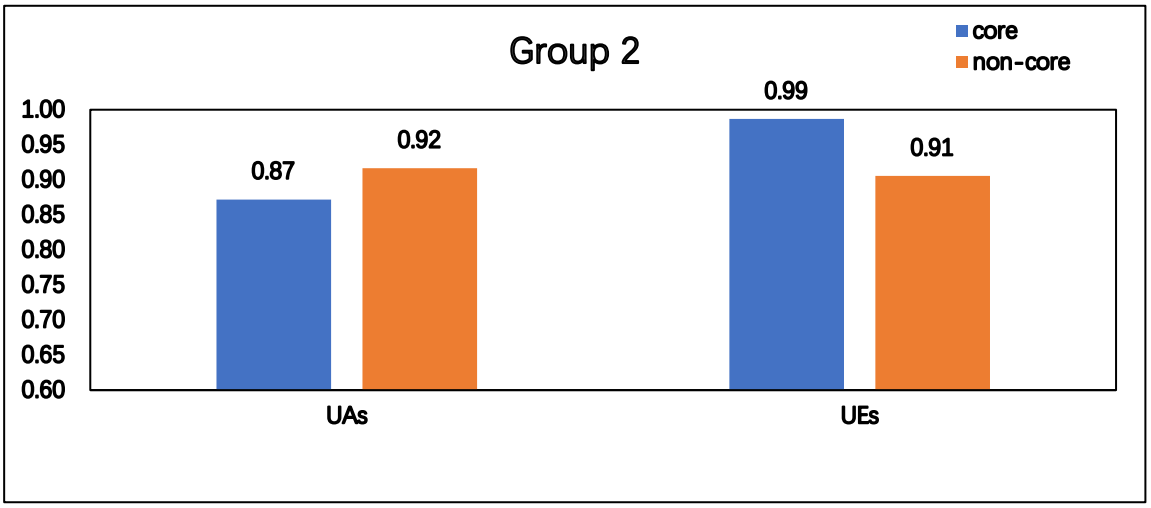
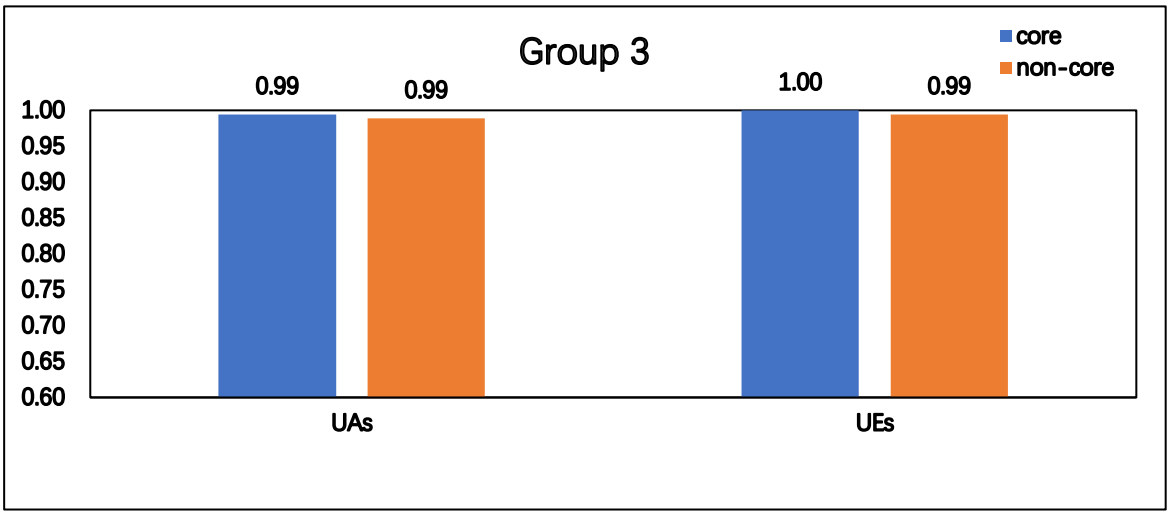


Figure 4.21 Group 2:The interaction effect between verb types and SIH types



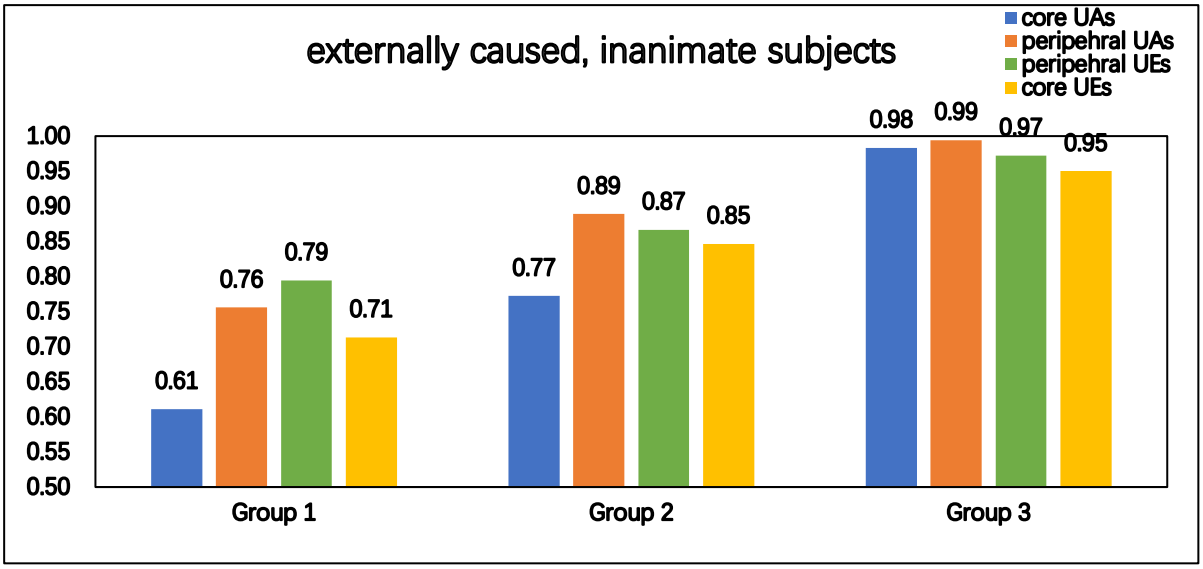
Group 3, as shown in Figure 4.22, did not passivize peripheral UEs more often than core ones, t (29) = 1.000, p = .326, nor did they passivize core UAs more often than peripehral ones, t (29) = 1.000, p = .326. In a nutshell, UAs are more liekly to be passivized than UEs with animate subjects when used in an externally caused context, and core UEs had the highest correct response rates among all the verb types. The results follow the prediction by the SIH.

Figure 4.22 Group 3: The interaction effect between verb types and SIH types



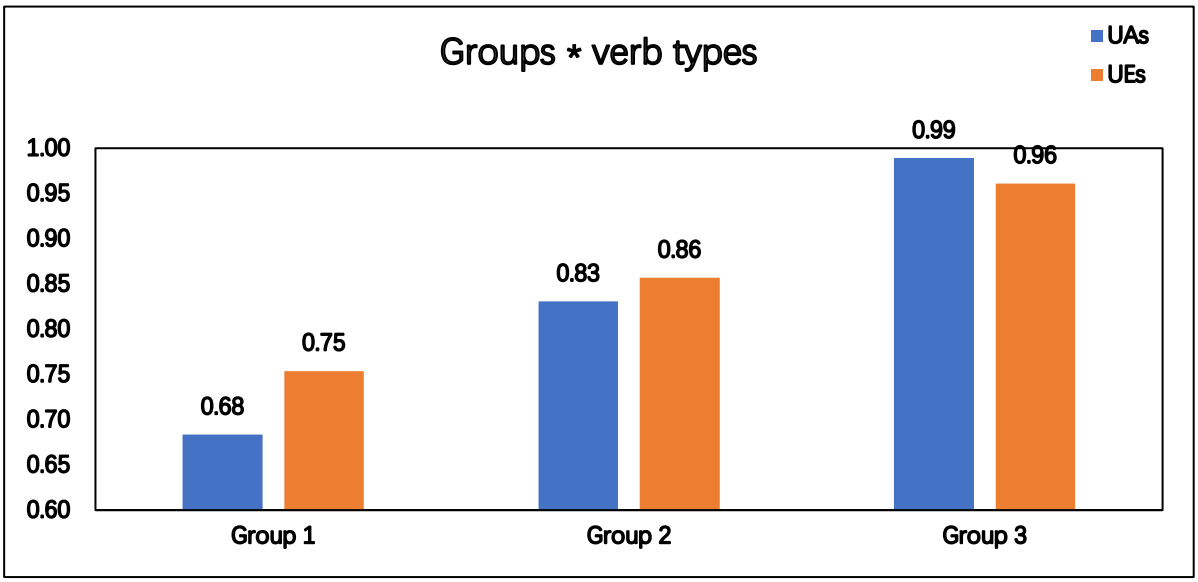
The seond condition to compare the four verb types is sentences in externally caused events with inanimate subjects. Figure 4.23 demonstrates that the overpassivization tendency is not the same as predicted by the SIH. In other words, core UE are not least likely to be passivized among all the verb types in all the three groups.

Figure 4.23 Mean correct response rates of the four verb types by groups



An ANOVA test for the second condition revealed that there is no significant main effect of verb types, F (1, 87) = 3.383, p = .069, but there is a significant interaction effect between verb types and groups, F (2, 87) = 5.183, p = .007, indicating that the mean accuracy rates for UAs and UEs are different according to the proficiency levels. As shown in Figure 4.24, L2 learners in Group 1 made more errors with UAs than with UEs, t (29) = -2.452, p = .020. Group 2 made less errors with UAs comapred with Group 1, and the response rate for UAs and UEs are not significantly different, t (29) = - 1. 261, p = . 217. Group 3, on the contrary, made more errors with UEs than with UAs, t (29) = 2.621, p = . 014.

Figure 4.24 The interation between groups and verb types



The ANOVA produced a main effect of SIH types, F (1, 87) = 25.51, p <.001, suggesting that core verbs of both verb types are more likely to be passivized than peripehral ones when the priming context is externally caused and the subject of the target sentence is inanimate. There is a significant interaction effect between SIH types and groups, as in Figure 4.25, F (2, 87) = 4.53, p =.013, but there is no interaction effect between verb types and SIH types, as in Figure 4.26, F (1, 87) = 2.67, p = .106. It indicates that L2 learners tend to passive core UAs more often than peripheral ones, t (89) = - 4.301, p < .001; they also tend to passivize core UEs more often than peripheral ones with non-animate subjects, t (89) = - 2.094, p = .039. There is no significant interaction among verb types, SIH types and groups, F (2, 87) = 1.099, p =.338, suggesting that all the three groups tend to passivize core UAs more often than peripheral ones in a similar pattern.

Figure 4.25 The interation between groups and SIH types

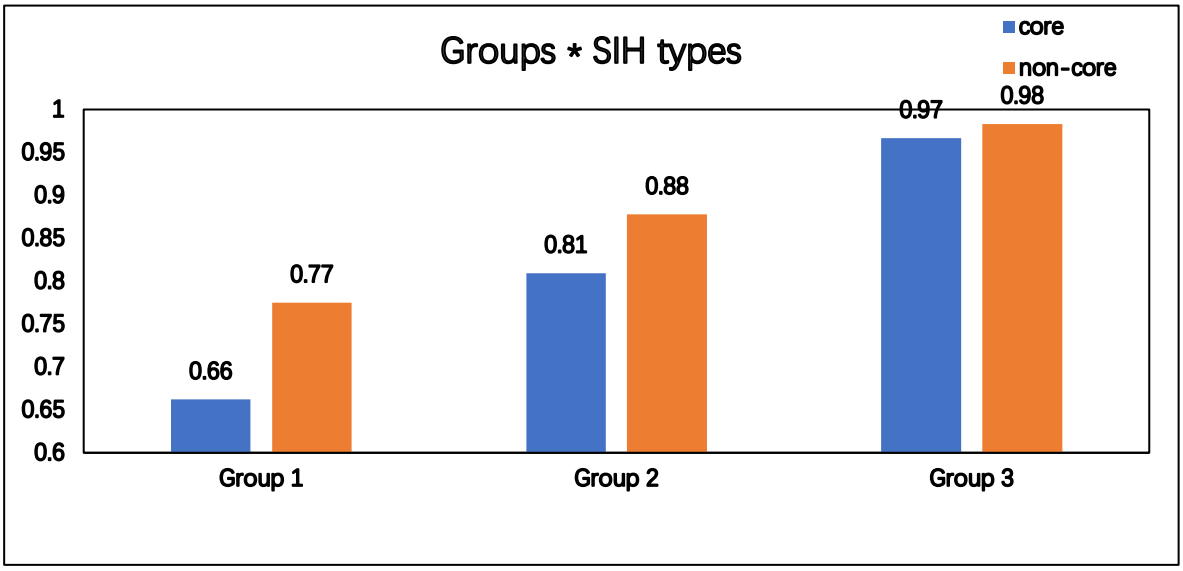
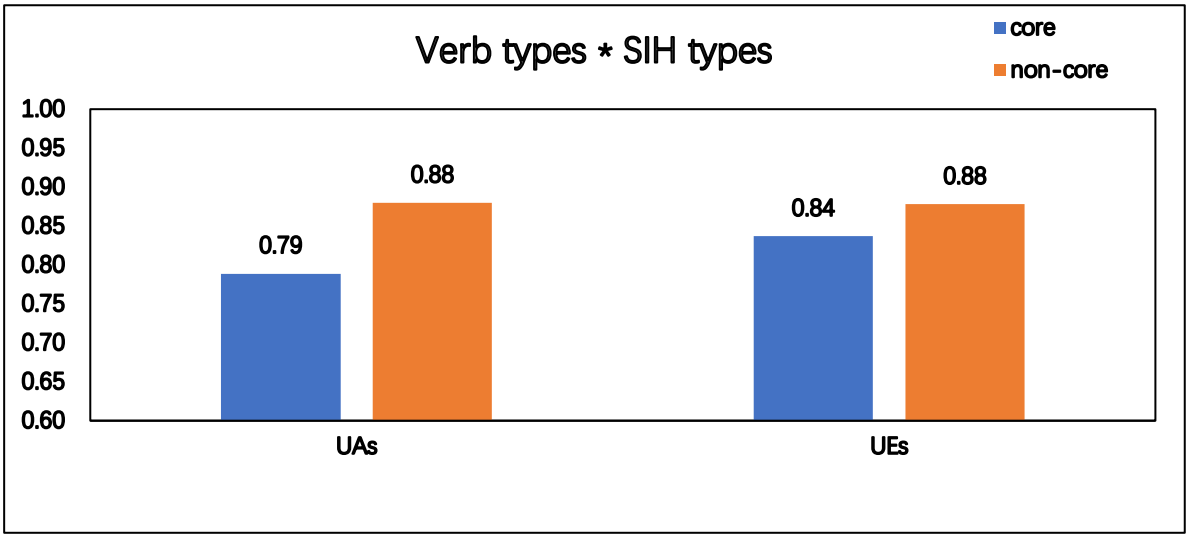
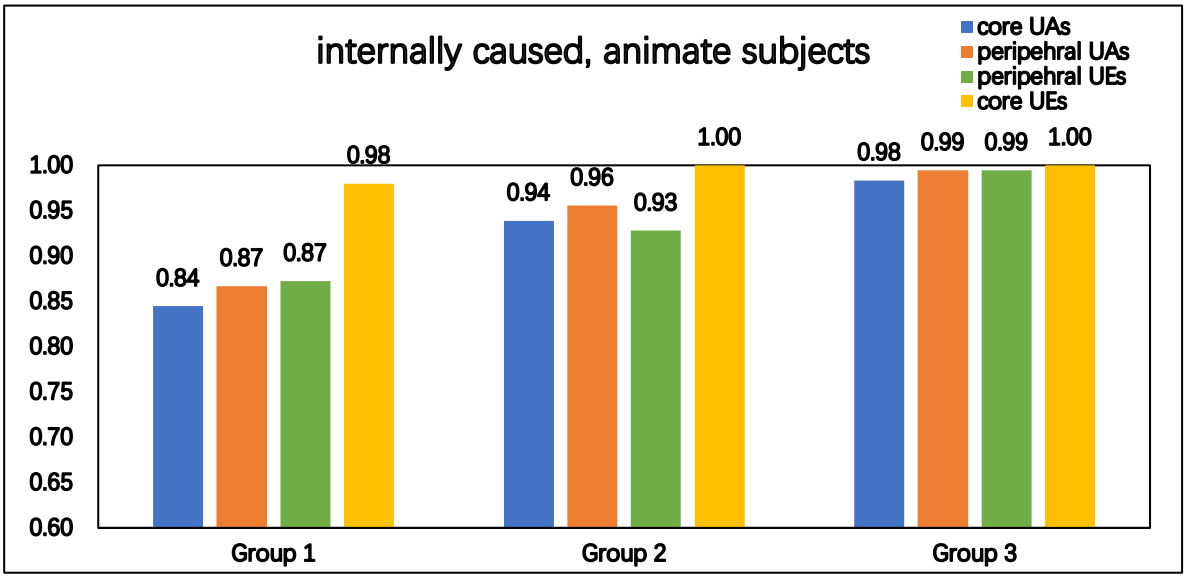


Figure 4.26 The interaction effect between verb types and SIH types



Data related to the four verb types were also compared when the priming context is internally caused and the subject of the target sentence is animate. It is predicted that this condition causes no problem for L2 learners. As can be seen in Figure 4.27, L2 learners seem to have a quite higher accuracy rate for core UEs from the very beginning. The accuracy rates for the four verb types at advanced level are almost native-like.

Figure 4.27 Mean correct response rates for the four verb types by groups



A separate ANOVA for the four verb types with the third condition showed that the main effect of verb type is significant, F (1, 87) = 13.22, p <.001, with UEs having a higher correct response rate than UAs; an interaction effect betwwen verb types and groups, F (2, 87) = 4.956, p =.009, suggesting that UEs are less likely to be passivized than UAs in Group 1, t (29) = -3.358, p = .002, but not in Group 2 and Group 3. The ANOVA also revealed a main effect of SIH types, F (1, 87) = 4.419, p = .038, and a significant three-way interaction among verb types, SIH types and groups, F (2, 87) = 4.025, p = .021. Figure 4.28 and 4.29 presents the interaction effect between verb types and SIH types for Group 1 and 2. The correct response rates for core and peripheral UAs are not significantly different (Group 1: t (29) = - 0.571, p = .573; Group 2: t (29) = -0.682, p = .501 while the response rates for core and peripheral UEs are different at a significant level (Group 1: t (29) = 3.962, p < . 001; Group 2: t (29) = 4.176, p < .001).

Figure 4.28 Group 1: The interaction effect between verb types and SIH types

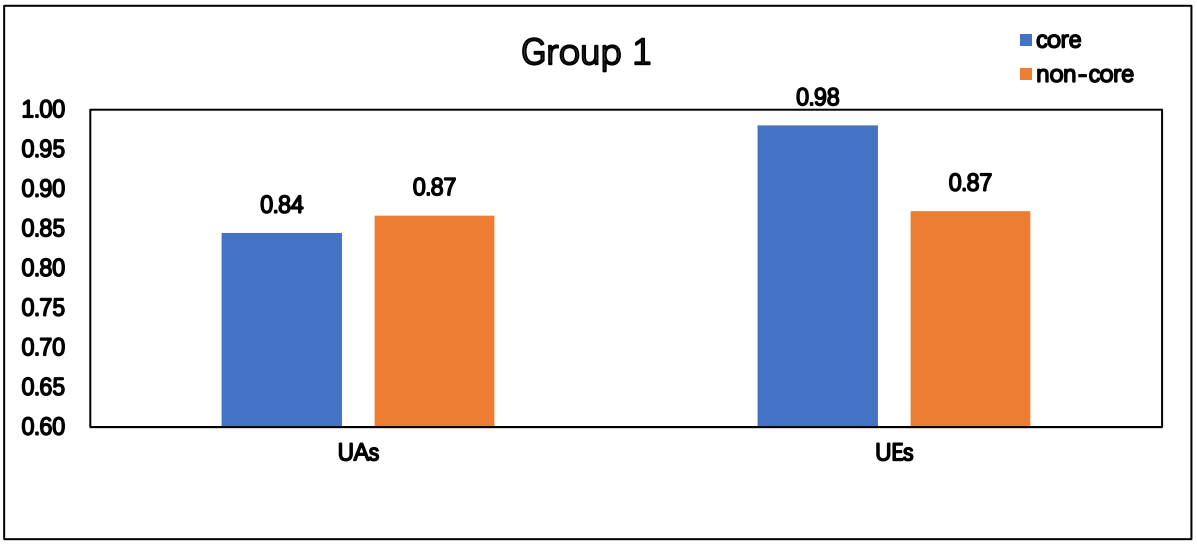
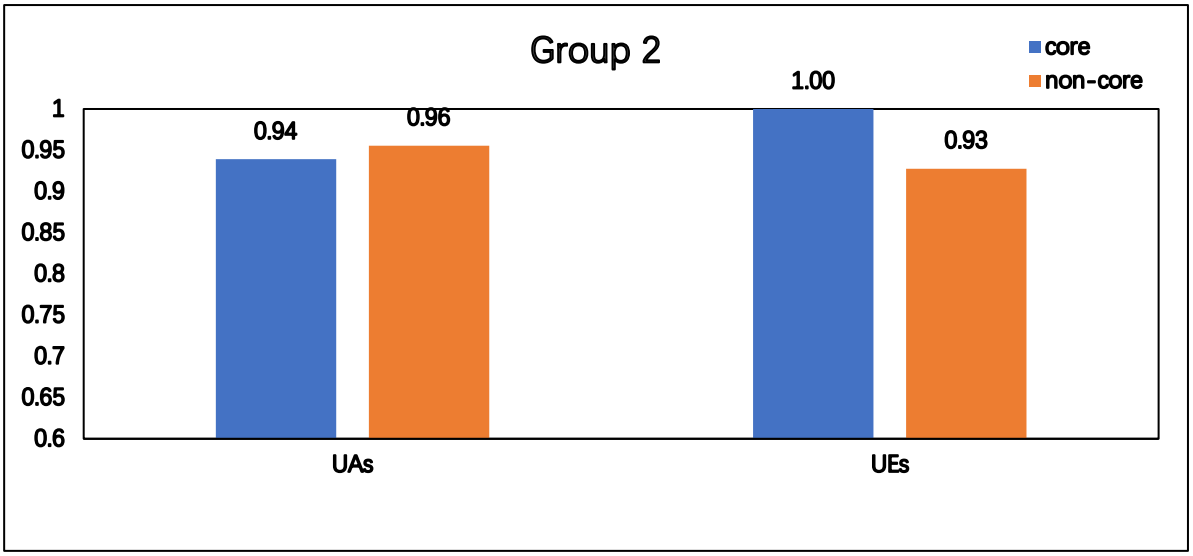
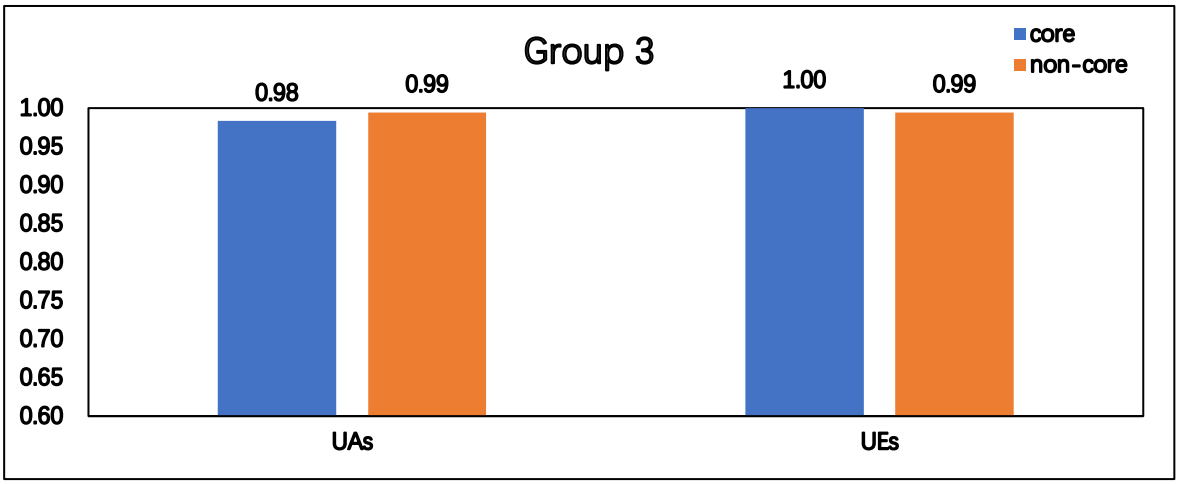


Figure 4.29 Group 2: The interaction effect between verb types and SIH types



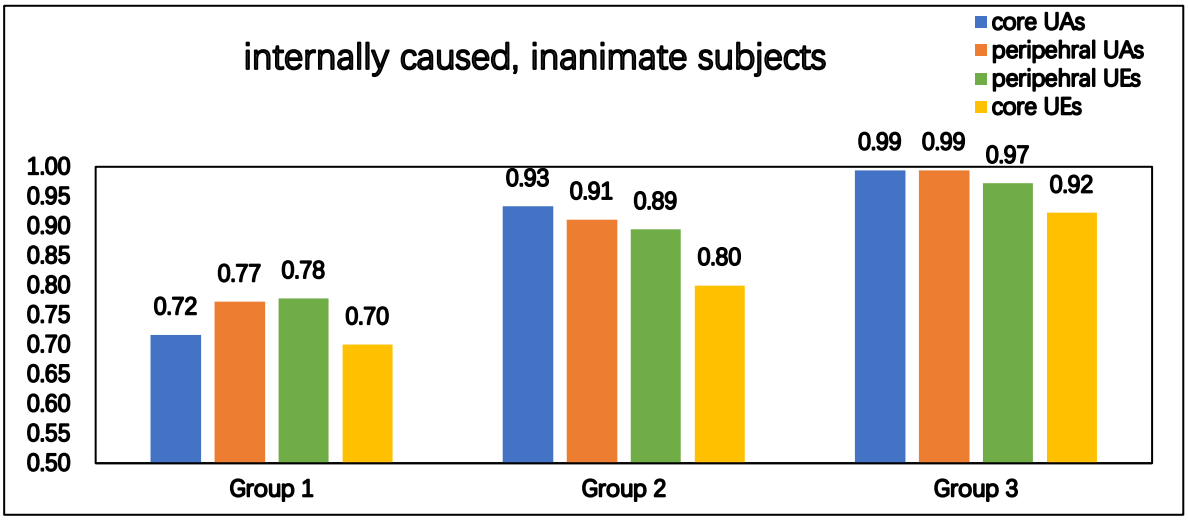
However, as can be shown in Figure 4.30, the correct response rates for core and non-core UAs for Group 3 are not statistically significant, t (29) = -1.000, p = . 326, nor are the correct rates for core and non-core UEs, t (29) = 1.000, p = . 326. In short, in this condition, only Group 1 learners made more errors with UAs than with UEs, and core UEs are least likely to be passivized by both Group 1 and Group 2 learners.

Figure 4.30 Group 3: The interaction effect between verb types and SIH types



The last condition to comapre the data of the four verb types is when the priming sentences provide an internally caused context, and the subject of the target sentece is inanimate. Figure 4.31 idicates that L2 learners made most errors with core UEs especially when the subjects are inanimate. Even advanced L2 learners still tend to make errors with core UEs with nonanimate subejcts.

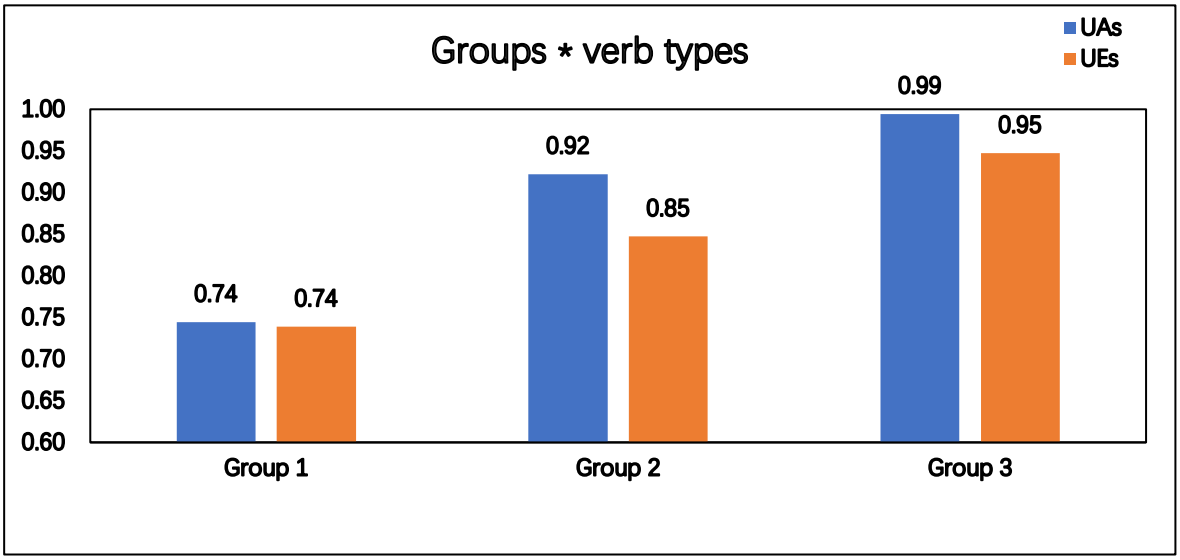
Figure 4.31 Mean correct response rates for the four verb types by groups



A separate ANOVA for this condition produced a main effect of verb type, F (1, 87) = 8.46,

p <.005, and no significant interaction between verb types and groups, F (2, 87) = 1.899, p = .156. As shown in Figure 4.32, UAs were not more likely to be passivized than UEs in Group 1, t (29) = .202, p = .842, but UEs were more likely to be passivized than UAs in Group 2, t (29) = 2.30, p = .029, and in Group 3, t (29) = 3.979, p < .001, which is contrary to the prediction by the SIH.

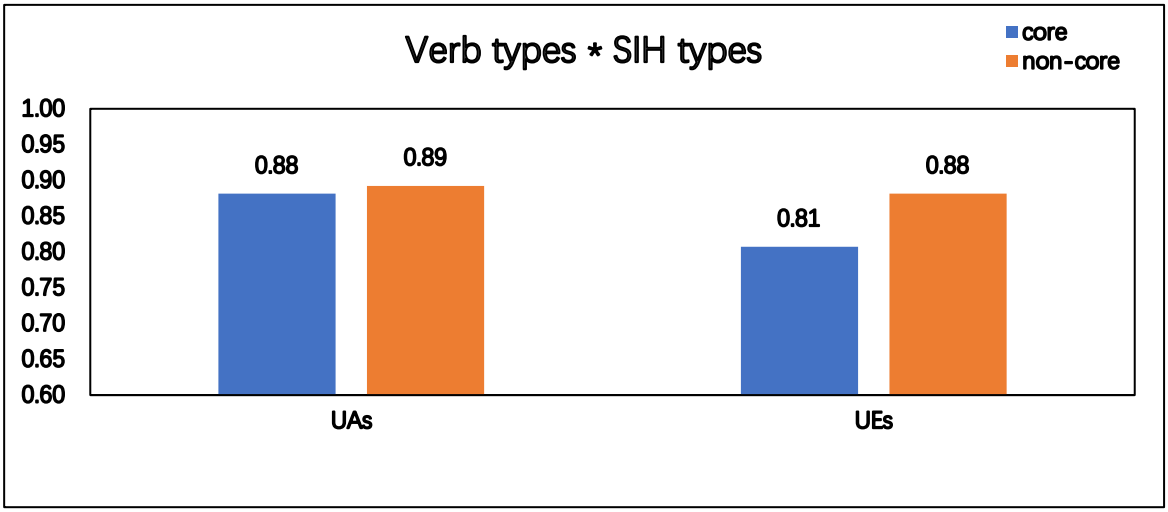
Figure 4.32 The interaction effect between groups and verb types



The ANOVA also yielded a main effect of SIH types, F (1, 87) = 11.816, p = .001, no significant effect between SIH types and groups, F (2, 87) = 1.011, p = .368, but a significant interaction effect between verb types and SIH types, F (2, 87) = 7.113, p = .009. As can be seen in Figure 4.33, the correct response rates between core and non-core UAs are not significantly different, t (89) = .669, p = .505, while the correct response rates for core and non-core UEs are different at a significant level, with core UEs being more likely to be passivized than non-core ones, t (89) = - 4.191, p < .001. Since there is no significant interaction effect among verb types, SIH types and groups, F (2, 87) = 1.409, p = .250, it suggests that the L2 learners in all the three

groups seem to passivize core UEs more often than peripheral ones, confirming the subset results for UEs.

Figure 4.33 The interaction effect between verb types and SIH types



To summarize, core UEs pose problems to Mandarin-speaking L2 learners when used with inanimate subjects. L2 learners, especially low proficiency learners, tend to passivize core UEs more often than UAs when used with inanimate subjects. Specifically, when the subject of the target sentence is animate, L2 learners have no difficulty with core UEs, and core UEs are least likely to be passivized among all the verb types. However, when the subject of the target sentence is inanimate, L2 learners, even advanced learners, have problems with core UEs and tend to passivize them more often than UAs.

4.4 Discussion

4.4.1 Telicity Effect

The first research question examines whether core telic UAs are more likely to be passivized than peripheral ones. The answer to the first research question is yes but with certain

constraints. The results for UAs suggest that intermediate Mandarin-speaking learners of English tend to passivize core UAs more frequently than non-core ones in externally caused events when the subject of the target sentence is inanimate. However, advanced learners do not show the tendency because their performance on UAs is almost native-like.

Previous studies of Yusa (2003) and Hirakawa (2006) have different answers for the first research question. Yusa (2003) provides an affirmative answer while Hirakawa (2006) presents a negative one. Yusa (2003) argues that Japanese-speaking L2 learners are more likely to incorrectly accept '*be*' with core telic UAs than with atelic non-core ones because Japanese L2 learners have the knowledge of auxiliary selection of BE and HAVE in Romance languages, though this knowledge is absent in both their L1 and L2 input. He maintains that BE is not a passive marker. Instead, he suggests that the use of BE auxiliary in L2 passive UAs is a reflection of the perfective auxiliary marker BE for UAs in auxiliary-selecting languages. If Yusa (2003) is correct in his prediction, core telic verbs should be more likely to be passivized than non-core ones regardless of causation types and animacy types because telic core UAs are more consistent in selecting the auxiliary BE than atelic ones. However, the experimental results reported in the present study find that core telic UAs are not always more likely to be passivized than atelic ones, implying that the Perfective Auxiliary Marker hypothesis proposed by Yusa (2003) is not supported.

The results of the present study are also inconsistent with the findings of Hirakawa (2006), who finds that core telic UAs are not more likely to be passivized than non-core ones. She argues for the Postverbal NP Movement Hypothesis, which predicts that L2 learners treat UAs as passives so that they tend to passivize UAs more often than UEs. However, she also admits

that this hypothesis cannot account for the results for non-core UEs because the hypothesis does not predict that UEs should cause a problem to L2 learners. Thus, she maintains that the results in her study do not fully support either Yusa's claim or her hypothesis.

Although the experimental results obtained from the study of Hirakawa (2006) were not consistent with the Perfective Auxiliary Marker, she admits that the study of Yusa (2003) is informative because the results suggest that L2 learners might be sensitive to the SIH but not to auxiliary selection in Romance languages. The SIH is a hierarchy that is based on the lexical-aspectual properties of verbs but not on auxiliary selection. Hirakawa (2006) claims that it is possible that L2 learners are sensitive to the semantic properties like telicity and agentivity, which are decisive in the UA-UE distinction. According to the SIH, non-core UEs including verbs of emission and verbs of manner of motion are neither telic nor highly agentive. They are weakly unergative and sometimes exhibit unaccusative behaviors. Hirakawa (2006) assumes that the Japanese learners in her study might group non-core UEs and UAs together and treat them alike.

It appears that the results of the present study are neither in accordance with the findings of Yusa (2003) nor Hirakawa (2006). There might be several reasons for such results. First, there is only a group of learners involved in the study of Yusa (2003) and Hirakawa (2006). The participants in the study of Yusa (2003) are 31 Japanese learners of English whose TOEIC scores ranged from 385 to 655, which corresponds approximately to Group 2 learners in the present study. Hirakawa's participants are 25 Japanese L2 learners who are assumed as intermediate level learners because they are first-year students. There is no further information as to their proficiency. It appears that participants in the two studies are not matched with

proficiency levels. As suggested by Chung (2014), proficiency levels certainly play an important role in the overpassivization tendency of UAs, which is also confirmed in the present study. Three groups of learners with different levels of proficiency were recruited in the study. Intermediate level learners are more likely to passivize core UAs than non-core ones. However, advanced L2 learners in the study seem to overcome the effect of telicity. For advanced learners, there is no significant difference between core and peripheral UAs in their mean correct response rates. If proficiency levels are not taken into consideration, it is invalid to compare the results obtained from participants of different proficiency levels.

Second, the different results might be owing to the task design. The test sentences in Yusa (2003) and Hirakawa (2006) consists of two parts, the first sentence providing a context for the second sentence, and the second sentence presenting a UA or UE verb. Both studies did not control the variables of causation types and animacy types. For example, the event in the second sentence can be construed as either internally caused or externally caused depending on the priming context. The subject of the target sentence is either animate or inanimate. Some test items from Hirakawa (2006, p. 37-38) are repeated here.

(39) a. Mary had a dog.

b. One morning, her dog disappeared/*was disappeared.

(40) a. Hanako and her family eat a lot of rice.

b. One bag of rice lasts/*is lasted for only one week.

(41) a. Traffic is heavy at this crossing.

b. A big accident happened/ *was happened last night.

(42) a. Taro put lots of pepper on his noodles.

b. He sneezed/*was sneezed all three times.

Example (39) provides an internally caused context in the priming sentence and an animate subject for the target sentence. The event described in the second sentence in (40) can be construed as an externally caused one, because the priming context provides an external causer for the event. Furthermore, the subject of the target sentence is non-animate. Example (41) provides an inanimate subject for the target sentence but the priming context is internally caused, while example (42) creates an externally caused context and the subject is animate. It appears that the factors of causation types and animacy types were not controlled in her study. Similar problems were observed in the study of Yusa (2003). The results turn out to be conflicting with each other because the results for core telic UAs and atelic ones were compared across different causation types and animacy types. The results of the present study show that the overpassivization tendency of core and non-core UAs vary with causation types and animacy types. When the subject of the target sentence is animate and the priming context is internally caused, there is no significant difference between core and non-core UAs. Therefore, it is hard to evaluate the telicity effects on overpassivization tendency of UAs without taking causation types and animacy types into consideration.

According to Chung (2014), multiple factors are responsible for the different rates of overpassivization errors of UAs. Causation types and animacy types are found to play significant roles in L2 acquisition of English UAs regardless of L1 backgrounds. That is, L2 learners passivize UAs more frequently in externally caused events than in internally caused events. They also tend to passivize UAs with inanimate subjects more frequently than those with animate subjects. The results obtained in the present study are consistent with the findings

of Chung (2014), suggesting that causation types and animacy types have effect on the tendency to passivize UAs. UAs in externally caused events were more likely to be passivized than those in internally caused events. UAs with inanimate subjects were also more likely to be passivized than those with animate subjects. Core UAs tend to be more likely to be passivized than non-core ones with inanimate subjects when used in an externally caused context.

Then a question arises: why are core telic UAs more likely to be passivized only in externally caused events when used with inanimate subjects? In other words, why do causation types and animacy types influence the overpassivization tendency of core UAs to a greater degree than non-core ones?

This might be due to the similarities between UAs and passives. On one hand, subjects in both passives and UAs bear the semantic role of theme or patient. An animate being is more likely to be associated with subjects because it is a prominent feature of agent, while an inanimate being is more prone to be linked to object since it is a prototype feature of theme (Dowty, 1991; Jackendoff, 1990). Though English is flexible in permitting nonagentive subjects, previous work has shown that the subject position tends to be occupied by nouns that are animate (Bock & Loebell, 1990). When the inanimate entity happens to be in the sentence position, speakers tend to produce passive sentences (Tomlin, 1983; Ferreria, 1993). Therefore, L2 learners are more likely to passivize UAs with inanimate subjects than with animate subjects, for they might treat non-animate subjects of UAs as theme subjects of passives. They appear to either passivize UAs or reject nonagent subjects in their interlanguage grammars.

On the other hand, UAs and passives are both used to express state or changes of state rather than actions. Semantically, non-alternating UAs typically denote spontaneous change of

state in which the agent is not involved. Passives are also used to express spontaneous occurrence. The typical function of passives is to describe "an event that automatically occurs, or a state that spontaneously obtains without the intervention of an agent." (Shibatani, 1985, p.287). The semantic similarity shared between UAs and passives motivate L2 learners to passivize UAs because L2 learners are less prone to believe that any change of state occurs spontaneously without external causers. They would conceptualize an agent for UAs and then tend to passivize UAs to suppress the agent.

For example, the event described in the (43a & b) are identical, indicating a spontaneous change of state of the butter. The difference between these two sentences is that there is no agent in (43a), while the agent is omitted in (43b).

(43) a. The butter melted.

b. The butter was melted.

For passives, the agent is suppressed and the theme is promoted to the subject position. Despite that the agent is suppressed in passives and sometimes can be omitted, the agent is implied semantically. In other words, there must have an external causer responsible for the event in the passives such as in *The butter was melted by the sun*. According to Ju (2000, p. 91), "the entity that caused the event to occur is a pragmatically conceptualizable agent of the predicate". Though there is no agent posited in (43a) for UAs, L2 learners would assume that there is a conceptualizable agent to cause the event to occur.

As suggested by Ju (2000) and Chung (2014), the conceptualizable agents in the discourse play an important role in influencing L2 learners' tendency to passivize UAs. Ju (2000)

hypothesizes that the availability of agents is evoked by causation types and the meaning of verbs. Levin and Rappaport Hovav (1995) distinguishes two types of causation, external causation and internal causation. The former refers to an event that is brought about some external force such as an agent or a causer, while the latter refers to an event in which the causer or initiator is less clear. Ju (2000) and Chung (2014) finds it is relatively easier to infer an agent in externally caused events than in internally caused events, which is also confirmed in the present study.

When there is a perceived agent for the direct cause of the event, L2 learners seem to be more willing to passivize UAs. For example, the event described by (44) and (45) are identical, but the difference lies in the priming contexts. The priming sentence in (44) provides an externally caused context, while the priming context in (45) presents an internally caused context. because there is no external force to make the event happen. UAs in an externally caused context bear more similarity with passives, because passives involve agent demotion or suppression. L2 learners appear to be more likely to passivize the target sentence in (44), because there is a conceptualizable agent like the fighter jet which could sink the ship.

(44) a. A fighter jet shot at the ship.

b. The ship sank slowly.

(45) a. The rusty old ship started breaking up.

b. The ship sank slowly. (Ju, 2000, p. 92)

Ju (2000) also maintains that the availability of agents is evoked by the meaning of verbs. It is easier to infer an agent or causer for some verbs than others. According to the SIH, telicity

is a primary feature for UAs. Core UAs are verbs that denote 'telic change', while non-core UAs are stative verbs that did not imply change. In other words, core UAs are more dynamic than stative verbs. As Yip (1995) points out, any events involving change of state are usually assumed to occur with certain external causation. It is easier to conceptualize an initiator or a causer for core telic UAs than for non-core statives because core UAs encode high degree of dynamicity than non-core ones. Thus, core telic UAs are more likely to be passivized than non-core verbs when used in an externally caused context.

4.4.2 Animacy Effect

The second research question examines whether core UEs are more affected by the animacy of the verb argument than non-core ones. The results of the present study provide an affirmative answer to the question. The overpassivization tendency of core UEs are affected by animacy types more strongly than non-core ones. When the subject of the target sentence is animate, core UEs had a higher correct response rate than non-core ones. It indicates that core UEs are less likely to be passivized than non-core ones. Upper-intermediate learners stop passivizing core UEs with animate subjects, and their performance is already native-like. When the target sentence is non-animate, core UEs are more likely to be passivized than peripheral ones, and intermediate learners still tend to passivize core UEs. Advanced learners did not passivize core UEs more frequently than non-core ones.

The results of the present study also show that L2 learners of the three groups are more likely to passivize UEs with inanimate subjects than with animate subjects. When the subject is animate, UEs, especially non-core ones, cause problems to low-intermediate learners but not to

upper-intermediate and advanced learners. When the subject is inanimate, L2 learners, even advanced level learners, tend to passivize UEs.

Previous studies show that animacy types play a significant role in L2 acquisition of UAs (Chung, 2014, Ju, 2000). UAs with animate subjects are less likely to be passivized than with inanimate subjects. The present study indicates that animacy types not only influence the overpassivization tendency of UAs but also of UEs. As discussed in 4.4.1, animacy is found to affect the overpassivization tendency of UAs. UAs with animate subjects had higher correct response rates than UAs with inanimate subjects. However, advanced learners had overcome the animacy effects on UAs, and they did not tend to passivize UAs with non-animate subjects. The effects of animacy on UEs, however, last even for advanced learners. Advanced level learners are still prone to passivize UEs with inanimate subjects more frequently than UEs with animate ones. It is indicated that animacy types affect the tendency of overpassivization of UEs to a greater extent than UAs because advanced L2 learners had overcome the animacy effects on UAs but not on UEs.

The results are partially in consistency with the findings of Vernice and Sorace (2018), who examine the animacy effects on the processing of Italian intransitive verbs. By monitoring Italian native participants' eye-movement when they processed sentences involving UAs and UEs with animate and inanimate subjects, their study finds that the animacy effect affected the processing of the subject argument of UEs to a greater extent than the processing of the subject argument of UAs. That is, the reading time of UEs with inanimate subjects is significantly longer than UEs with animate subjects, while there is no significant difference in the reading time between UAs with inanimate subjects and UAs with animate ones. The results confirmed

that the subject argument of UAs and UEs are not processed in the same way in Italian. Agentivity is a primary feature of unergativity, and it plays an important role in deciding a strong preference for animate agents in UEs but not for UAs.

There might be two reasons responsible for the different animacy effects on UAs and UEs. First, the argument of UAs and UEs have different thematic properties. The argument of UAs is usually non-agentive, which bears the thematic role of patient or theme, while the argument of UEs is typically agentive, which bears the role of agent (Dowty, 1991; Van Valin, 1990). An agent is the voluntary initiator of some action (Fillmore, 1968; Jackendoff, 1990) that tends to be typically animate. Inanimate entities generally lack volition and initiation. On the assumption that the arguments of UEs are agents and prototypical agents tend to be animate (Comrie, 1989; Dowty, 1991), the argument of UEs typically requires an animate entity while the argument of UAs does not. Second, the lexical properties underlying the UA-UE distinction are different. As suggested by the SIH, agentivity is a fundamental property of unergativity, while telicity is a primary feature of unaccusativity (Sorace, 2000, 2004, 2011). UAs typically denote change of location or change of state. UEs typically involve actions that are performed by a prototypically agentive argument, and agentive arguments tend to be animate (Dowty, 1991; Van Valin, 1990). Therefore, agentive UEs tend to show a stronger preference for animate entities while non-agentive UAs do not exhibit the preference. The violation of animacy expectation has a stronger effect on UEs than on UAs.

Furthermore, the study finds that animacy types have a stronger effect on core UEs than peripheral ones. Agentivity is assumed to be the primary feature that distinguishes core UEs from peripheral ones. Recall that maximally agentive verbs at the bottom of the UE end of the

hierarchy are core verbs denoting controlled processes. It is predicted that core verbs that are strongly agentive would indicate a stronger preference with animate subjects than non-agentive peripheral UEs. The results of the study indicate that the position of the verb along the SIH continuum influences the overpassivization tendency of UEs. When the argument of the verb is animate, core UEs are less likely to be passivized than non-core ones; when the argument of the verb is non-animate, core UEs are more likely to be passivized than non-core ones. The experimental results confirm that the animacy types influence core UEs to a greater extent than peripheral ones.

The results of the present study are also in line with the findings of Vernice and Sorace (2018). In Italian, core UEs are categorical in selecting auxiliary '*have*' as a perfective marker, whereas peripheral UEs are more variable in selecting '*be*' or '*have*' as a perfective marker. Regression data of UEs indicate that inanimate subjects caused more regression in core UEs in comparison with non-core ones. According to Vernice and Sorace (2018), the explanation for the regression data might be due to the 'semantic (or thematic)' accounts (Trueswell et al., 1994; Ferretti et al., 2001), which suggests that the comprehension system attempts to set up a link between the animacy of subject and the thematic and aspectual features of the verb. When the argument of the verb is inanimate, the comprehension system forces reanalysis, as indicated by more regressions, because the animacy of the subject does not match the verb's semantic entailment like agentivity. The argument of UEs is typically an agent, and agents are prototypically animate entities (Bock and Warren, 1985; Dowty, 1991). Core UEs are assumed to be more agentive than peripheral ones. Therefore, the preference of animate subjects is modulated in a gradient fashion, with core UEs with non-animate subjects signaled more

regressions to previous regions compared to non-core ones.

Returning to the data of the present study, it seems that L2 learners did not tend to passivize core UEs when the animacy of subjects in the target sentence inherently fits the verb's thematic entailment. That is, when the animate subject of the target sentence matches the high agentivity entailment of core UEs, L2 learners know the grammatical form of core UEs. However, when the subject in the target sentence appears to be non-animate, L2 learners would rapidly assign the thematic role of a patient or theme to the argument in order to fit the semantic entailment of the verb (Trueswell et al., 1994). In other words, L2 learners would treat the subject argument of core UEs as the promoted subject of passives, which bears the thematic role of patient. Thus, they tend to passivize core UEs more frequently than non-core ones when the subject argument is inanimate.

What is interesting in the present study is that causation types do not play a significant role in the tendency to over-passivize UEs. In other words, there is no significant difference in the correct response rates between UEs in externally caused events and UEs in internally caused events. UEs in externally caused events are not more likely to be passivized than UEs in internally caused events. UEs, unlike UAs denoting events that typically involve a change of state, usually denote controlled or uncontrolled processes. Core UEs are agentive and volitional processes, whereas peripheral/non-core UEs are less agentive and volitional (Dowty, 1991; Van Valin, 1990). Levin and Rappaport Hovav (1995) assume that agentive verbs are always internally caused. Therefore, for core UEs, there is no necessity to conceptualize an agent for the event, for the verb itself denotes high agentivity. To sum up, the most important factor that could influence L2 learners' tendency to passivize UEs is animacy types and the pattern of

influence varies depending on the position of the verb along the hierarchy (the core-peripheral distinction).

4.4.3 The SIH Effect

The third research question investigates if L2 learners would passivize UAs more frequently than UEs, especially core UEs, as predicted by the SIH. The results of the current study indicate that the correct response rates for UAs and UEs depend greatly on causation types, animacy types and proficiency level. It is difficult to draw a simple conclusion that core UEs are least likely to be passivized among all the verb types for all the learners of different proficiency.

Specifically, when the priming context is externally caused and the subject is animate, both Group 1 and Group 2 learners tend to have a higher correct response rate for UAs than for UEs, and core UEs are least likely to be passivized among all the verb types. The results for the first condition are in congruent with the findings of a great number of previous studies (Balcom, 1997; Hirakawa, 2003; Oshita, 2001; Zobl, 1989). They find that L2 learners of different L1s are more likely to overgeneralize passive morphology to UAs than to UEs because they differentiate the different argument structures of UAs and UEs and treat UAs as passives. Nevertheless, advanced L2 learners did not passivize UAs more frequently than UEs. They seem to have a target-like knowledge for UAs and UEs.

When the priming context is externally caused but the subject of the target sentence is non-animate, only Group 1 learners tend to passivize UAs more frequently than UEs. UAs are not more likely to be passivized than UEs by Group 2 learners. This is due to the fact that Group 2

learners began to overcome the animacy effects on UAs. Group 3 learners, contrary to the expectation, passivize core UEs more frequently than UAs. The results for the second condition did not follow the prediction of the SIH, but they provide additional evidence for the role of animacy effects on UEs. It is relatively easier for advanced learners to overcome the animacy effects on UAs compared to UEs, for animacy is a fundamental feature of unergativity.

The easiest condition for L2 learners is the third condition when the priming context is internally caused and the subject of the target sentence is animate. Group 1 learners are more likely to passivize UAs in comparison to UEs. Core UEs are least likely to be passivized among all the verb types by Group 1 and Group 2 learners, which is in consistence with the prediction of the SIH. The correct response rates for UAs and UEs in Group 2 and Group 3 did not reach at a significant level, for upper-intermediate learners in Group 2 began to have nearly native-like knowledge on the grammatical form of both UAs and UEs.

The last condition, in which the context is internally caused and the subject is inanimate, also poses great problems for L2 learners. The overall results for this condition did not follow the predictions by the SIH. L2 learners in Group 1 did not passivize UAs more frequently than UEs. As discussed above, animacy types affect UEs to a greater extent than UAs. L2 learners in both Group 2 and Group 3 are more likely to passivize UEs than UAs. Upper-intermediate learners in Group 2 started to overcome the animacy effects on UAs and advanced learners have achieved a native-like knowledge on UAs. However, advanced learners still tend to passivize core UEs, and their knowledge on UEs with inanimate subjects is still not target-like.

According to the SIH, telicity is the primary feature of unaccusativity (Sorace, 2000, 2004; 2011). Yusa (2003) finds that telic UAs are more likely to be passivized than atelic ones, and

UEs are less likely to be passivized in comparison with UAs. Hirakawa (2006), however, holds that there is no significant difference between telic and atelic UAs, but a significant difference between core and peripheral UEs. She also suggests that core UEs are least likely to be passivized among all the verb types. The seemingly conflicting results of those studies can be resolved by taking causation types and animacy types into consideration.

The experimental results reported in the present study find that the overpassivization tendency of UAs are subject to the influence of multiple factors including telicity, animacy types, causation types and proficiency. For low and upper intermediate learners, core UAs are more likely to be passivized than non-core ones when the causation type is external and the subject of the target sentence is inanimate. Advanced learners do not tend to passivize UAs regardless of causation types and animacy types. Thus, it is rather difficult to draw a simple conclusion that L2 learners are more likely to passivize core telic UAs than non-core ones without taking other factors into consideration.

Agentivity is claimed to be the fundamental feature of UEs (Sorace, 2000, 2004, 2011). Previous studies on overpassivization errors only investigated the effect of animacy types on UAs (Chung, 2014; Ju, 2000; Pae et al., 2014), but there is a lack of studies on animacy effects on UEs. The present study finds that animacy is found to have a stronger effect on UAs than on UEs, especially on core UEs. When the subject argument is animate, core UEs pose no problems to L2 learners, as suggested by previous studies (Hirakawa, 2006; Oshita, 2001), but UAs still cause problems to L2 learners. It indicates that the argument structure of UAs and UEs are represented differently in L2 learners' interlanguage grammar. When the subject of the target sentence is inanimate, advanced learners overcome animacy effects on UAs because they

gradually realize that the argument of UAs is not agent. However, advanced learners are still prone to passivize core UEs with inanimate subjects more frequently than peripheral ones. The overall results on the subset of UEs are in line with the prediction by the SIH since core UEs have a stronger preference for animate subjects.

4.5 Summary

To conclude, the present study addresses the factors that influence the overpassivization tendency of intransitive verbs. More specifically, the current study mainly examines if telicity and animacy effects play important roles in making L2 learners to over-passivize intransitive verbs. Telicity effects on the tendency to over-passivize UAs only works under certain conditions because the overpassivization tendency of UAs are subject to the influence of multiple factors. Core UAs are more likely to be passivized than non-core ones only when the subject argument is inanimate and the priming context is externally caused. As predicted by the SIH, animacy types affect the overpassivization tendency of core UEs to a greater extent than non-core UEs. Core UEs are less likely to be passivized than peripheral ones when used with animate subjects; they are more likely to be passivized than peripheral ones when used with non-animate subjects. These findings give additional support for the plausibility of a gradient model of split intransitivity.

Though many previous studies repeatedly state that L2 learners of different L1s tend to overextend passive morphology to UAs more often than to UEs (Balcom, 1997; Oshita, 2000; Yip, 1995), the current study shows that UAs are not always more likely to be passivized than UEs. The overpassivization tendency of UAs and UEs are dependent on causation types,

animacy types and proficiency levels. A multi-faceted approach towards the overpassivization phenomenon of intransitive verbs might account for some seemingly conflicting findings of previous studies (Yusa, 2003; Hirakawa, 2006). The results obtained from the present study offer more supporting evidence for the psychological reality of the core-peripheral distinction in L2 learners' interlanguage grammar.

Chapter 5 Conclusion

This chapter summarizes the major findings of the present study, pointing out implications of the study and suggestions for future work. Section 5.1 briefly summarizes the findings obtained in the two studies reported in Chapter 3 and 4 and outlines how these findings fulfill the purposes of the present study. Section 5.2 states the implications of the study on the relevant issues, including implications for split intransitivity, overpassivization tendency and L2 acquisition. The last section concludes the chapter with suggestions for future work in this field.

5.1 Summary of Major Findings of the Present Study

5.1.1 Summary of Chapter 3

In chapter 3, I have discussed whether Mandarin-speaking L2 learners of English would rely on semantic evidence in acquiring the syntax of split intransitivity in terms of the first experiment designed for answering the first research question. The first research question can be further divided into three research questions posed in Chapter 3. The findings are summarized below in the order of the research questions.

First of all, the findings obtained in the first experiment demonstrate that intermediate and advanced Mandarin learners exhibit sensitivity to the UA-UE distinction in the L2 acquisition of the syntax of split intransitivity. The mean correct response rates for UAs in PPPs are significantly higher than those for UEs in PPPs. Given that nouns that can be pre-modified by past participles are subjects of UAs or objects of transitive verbs, the results indicate that L2 learners in the present study treat the subjects of UAs as internal arguments that are like direct objects of transitive verbs, and the subjects of UEs as external arguments that are similar to

subjects of transitive verbs. Furthermore, the findings in the experiment also indicate that Mandarin speakers distinguish UAs and UEs in the *for hours* constructions. Their judgments on UAs and UEs in the construction are significantly different, suggesting that they are sensitive to the aspectual feature of telicity, which is assumed to be the primary feature that distinguishes UAs from UEs.

Secondly, the findings of this study indicate that Mandarin-speaking L2 learners display sensitivity to the core-peripheral distinction in a manner similar to native speakers of English. Native speakers, as predicted, show a stronger preference to core UAs in PPPs, while they indicate a less determinate judgment on peripheral UAs but a clear rejection of PPPs with UEs in general. L2 learners are less determinate in their judgments of PPPs with peripheral UAs and UEs in general, but do accept PPPs with core UAs more readily than those with UEs. Further evidence for the core-peripheral distinction can be gained from the results concerning the *for hours* constructions. Native English speakers tend to reject the *for hours* constructions with core UAs because telic verbs are incompatible with time duration adverbials. They accepted peripheral UAs because most of the stative verbs tested in the study are compatible with the *for hours* constructions. Mandarin-speaking L2 learners tend to exhibit the same gradience in their judgments as native speakers do, which correlates with the results of the PPPs.

Finally, the results of this study find that Mandarin learners are conditioned by the SIH in their acquisition of PPPs, starting with core UAs and gradually spreading to the peripheral UAs. They exhibited native-like judgments of PPPs with core UAs, but differed significantly from native English speakers in their judgments on peripheral UAs. Core UAs, therefore, have primacy in L2 acquisition of English split intransitivity, as predicted by the SIH. As to the *for*

hours constructions, native English speakers tested in this study were more willing to accept UEs and atelic peripheral UAs, as expected. Mandarin learners exhibited a similar pattern in judgments on core and non-core UAs, and no significant difference was found between native speakers and L2 learners in their judgments on the UA subtype. However, though L2 learners have exhibited native level judgments on both core and peripheral UAs, the results of this study also found that peripheral UAs are acquired earlier than the core ones in the *for hours* constructions, which is contradictory to what the SIH predicts.

L1 Mandarin allows both UAs and UEs with durative time adverbials, so the results suggest that the L2 learners in this study have already recovered from L1 transfer, and noticed the incompatibility of telic verbs with durative time adverbials in L2 English. However, compared with much positive evidence for the compatibility of peripheral UAs in the *for hours* constructions, the acquisition of core UAs in the absence of unambiguous evidence poses a greater learning problem. In this situation, peripheral UAs have primacy in L2 acquisition of the *for hours* constructions.

5.1.2 Summary of Chapter 4

In chapter 4, I explored the second research question which examined if the overpassivization tendency of intransitive verbs is sensitive to the predictions by the SIH. If the SIH constrains the L2 acquisition of intransitive verbs, it would be predicted that core and non-core verbs are represented differently in L2 learners' interlanguage grammars. Telicity is a primary feature that distinguishes core UAs from non-core ones, and agentivity is a fundamental feature that separates core UEs from non-core ones. Animacy has been found to influence the

overpassivization tendency of UAs, but there is a lack of studies on the role of animacy on UEs. On the assumption that prototypical agents tend to be animate, it is predicted that animacy types of the verb argument should affect UEs, which denote agentive events, more strongly than non-agentive UAs. The role of telicity and animacy effects on the overpassivization tendency of intransitive verbs has been explored. The second research question is further divided into three research questions. The major findings are summarized as follows.

Firstly, the overpassivization tendency of core and non-core UAs depends greatly on causation types, animacy types and proficiency. Intermediate learners are more likely to passivize UAs in externally caused events than in internally caused events. They also tend to passivize UAs with inanimate subjects more frequently than UAs with animate subjects. Core UAs are more likely to be passivized than non-core ones only in externally caused events when the subject is inanimate. It is easier to conceptualize an initiator or a causer for core telic UAs than for non-core statives because core UAs encode a high degree of dynamicity than non-core ones. Advanced learners did not passivize core and non-core UAs regardless of causation types and animacy types.

Secondly, the overpassivization tendency of core and peripheral UEs varies according to animacy types and proficiency. L2 learners did not have much difficulty with UEs when used with animate subjects. However, they are prone to passivize UEs with inanimate subjects more often than UEs with animate subjects. Core UEs are affected by animacy types to a greater extent than non-core UEs. For intermediate learners, core UEs are less likely to be passivized when the subject of the sentence is animate, while core UEs are more likely to be passivized than non-core ones when the subject of the sentence is inanimate. Advanced learners did not

have any problems with UEs with animate subjects, but they still tended to passivize UEs with inanimate subjects more frequently than UEs with animate subjects. Furthermore, animacy types are found to affect UEs to a greater degree than UAs. Advanced learners stop passivizing UAs with inanimate subjects, whereas they are still likely to passivize UEs with inanimate subjects.

Finally, the findings in the present study suggest that core UEs are not always least likely to be passivized among all the verb types. Previous studies on overpassivization predict that L2 learners tend to have problems with UAs but not with UEs. It is assumed that if L2 learners are sensitive to the UA-UE distinction, they would be likely to overextend the passive morphology when promoting the argument of UAs in the object position to the subject position. They are not expected to overgeneralize the passive morphology to UEs because the argument of UEs is originated in the subject position. Peripheral UEs are found to cause problems for L2 learners since peripheral UEs like verbs of manner of motion and emission can also be classified as UAs (Hirakawa, 2006). As predicted by the SIH, they might group non-core UEs as UAs so they are likely to passivize non-core UEs. However, the findings in the present study also indicate that core UEs cause problems to L2 learners when used with inanimate subjects. Intermediate learners tend to passivize core UEs more frequently than non-core UEs and UAs when used with inanimate subjects. The results are consistent with the prediction by the SIH, which claims that agentivity is a fundamental feature of UEs. Core UEs denoting agentive events show a stronger preference with animate subjects than less agentive UEs and non-agentive UAs.

The present study set forth three research goals in the beginning of the dissertation. Firstly, the present study examines to what extent the core-peripheral distinction for split intransitivity

is cross-linguistically consistent and to what degree direct access to an aspectual and thematic hierarchy at the syntax-lexicon interface is possible. The findings in the first experiment confirm that the SIH tends to be cross-linguistically consistent in languages with or without auxiliary selection. Although the UA-UE distinction is universal, English and Mandarin Chinese have different ways to encode the distinction. It is difficult for Mandarin L2 learners to acquire the UA-UE distinction in English, which does not have an overt and obligatory marker for the distinction. Mandarin-speaking L2 learners, therefore, rely on the semantic evidence in acquiring the syntax of English split intransitivity, and they tend to acquire core verbs first and gradually spread to peripheral ones. The experimental results provide further support for the cross-linguistic plausibility of the SIH to split intransitive patterns.

Secondly, the present study addresses if the overpassivization tendency of intransitive verbs is subject to the prediction by the SIH. Previous studies hold conflicting claims about the role of the SIH in predicting the overpassivization tendency of intransitive verbs (Hirakawa, 2006; Yusa, 2003). The findings of the present study demonstrate that the overpassivization tendency of intransitive verbs is subject to the prediction of the SIH in that causation types affect the overpassivization tendency of UAs but not UEs, and animacy types affect the overpassivization tendency of UEs to a greater extent than UAs. The experimental results provide further evidence for the plausibility of the SIH, which claims that telicity is a primary feature of unaccusativity and agentivity is a fundamental feature of UEs.

Finally, the present study also investigates the nature of the interlanguage grammars. Although L2 learners' knowledge on PPPs and the *for hours* construction is not native-like in general, they display sensitivity to the core-peripheral distinction. Furthermore, core and

peripheral verbs are represented differently in Mandarin-speaking L2 learners' interlanguage grammars, so core and non-core verbs have different rates of overpassivization. The findings obtained from the two experiments suggest that the interlanguage grammars are not wild but UG constrained.

5.2 Implications

This section presents the three implications of the present study, including implications for split intransitivity, the overpassivization tendency and L2 acquisition.

5.2.1 Implications for Split Intransitivity

L2 acquisition has always been assumed to be an important testing ground for different theories of the lexicon-syntax interface. The original claim of the Unaccusative Hypothesis is a binary distinction of intransitive verbs into UAs and UEs, but the Unaccusative Hypothesis has been challenged empirically. Myriad empirical research has shown that there are inconsistencies between the semantic and syntactic properties of split intransitivity (Borer, 2005; Levin & Rappaport Hovav, 1995). Empirical data have repeatedly shown that there seems to be an imperfect match between the verbs expected to be selected as either UAs or UEs by different diagnostics and the verbs selected by those diagnostics. The situation is known as "unaccusative mismatches", and it is quite difficult to fit many verbs unambiguously into one class or the other.

Various hypotheses have been proposed to tackle the so-called "unaccusative mismatches", trying to identify the syntactically relevant semantic properties of the verb that determine the syntactic structure. On the assumption that split intransitivity is syntactically encoded but semantically determined, the projectionist approach argues that the lexical semantic features of

a verb could project its arguments as either internal or external through linking rules (Levin & Rappaport Hovav, 1995; 2005). Three semantic properties such as Direct change, Immediate change and Existence are mapped onto the position at argument structure through several linking rules. The problem with the projectionist approach is that the semantic properties and the linking rules seem to be language-specific, and it cannot account for the variation exhibited by some verbs. The gradient approach, on the contrary, claims that agentivity and telicity are two key factors whose interaction affects the syntax of split intransitivity. Depending on the interaction of 'the lexical properties of the verb and the aspectual composition of the predicate' (Sorace, 2011, p.74), some verbs are quite consistent with one type of projection, while other verbs are permissible with different projections to variable degrees. A great number of previous studies on L1 and L2 acquisition of split intransitivity in Romance and other Germanic languages offer evidence for the gradient variation of the SIH.

The findings in the present study provide further support for the plausibility of the SIH in capturing the gradient variation of intransitive verbs. Mandarin-speaking L2 learners are not only sensitive to the UA-UE distinction, but also to the core-peripheral distinction. Core verbs have primacy in both L1 and L2 acquisition, and L2 acquisition of split intransitivity is lexically constrained by the SIH. The gradient approach, compared with the projectionist approach, makes a step further to predict some verb classes are more consistent in their syntactic behaviors while others exhibit more variation.

5.2.2 Implications for the Overpassivization Tendency

Previous studies on overpassivization have always been cited as evidence for the UA-UE

distinction (Balcom, 1997; Zobl, 1989; Yip, 1995; Chung, 2014; Pae et al., 2014). Studies based on the production data find that L2 learners of different L1s tend to overgeneralize passive morphology to UAs but not to UEs. The phenomenon, referred to as overpassivization, indicates that L2 learners realize that the argument of UAs and UEs are different. In addition to the syntactic account, previous studies also find that the overpassivization tendency of UAs are subject to multiple factors such as causation types and animacy types since there are different rates of error production between verbs (Chung, 2014; Ju, 2000; Kondo, 2005; Pae et al., 2014). However, it remains controversial if the SIH plays a role in influencing the overpassivization tendency of intransitive verbs. Hirakawa (2006) suggests that the results in her study demonstrated that core telic UAs are not more likely to be passivized than non-core ones, whereas Yusa (2003) claims that L2 learners tend to passivize core UAs more frequently than non-core ones.

The findings in the present study suggests that the overpassivization tendency is subject to the prediction by the SIH. Telicity is assumed to be a fundamental feature of UAs, and agentivity is primary feature of UEs. Therefore, causation types and animacy types affect the overpassivization tendency of UAs and UEs to different degrees. For UAs, telicity effects interplay with causation types and animacy types. UAs in externally caused events are more likely to be passivized than UAs in internally caused events, and UAs with inanimate subjects are more likely to be passivized than UAs with animate subjects. Core UAs are more likely to be passivized than non-core ones only in externally caused events with inanimate subjects, but advanced learners do not have any problems with core and non-core UAs. They overcome the caution effects and animacy effects. As for UEs, causation types have no effect on the

overpassivization tendency of UEs but animacy types significantly affect the overpassivization tendency of UEs. UEs with animate subjects are less likely to be passivized than UEs with inanimate subjects. Even advanced learners tend to passivize UEs with inanimate subjects. Core UEs are more likely to be passivized than non-core ones when the subject of the target is inanimate.

Though the present study is partially consistent with the findings of Yusa (2003), it does not necessary support the Perfective Auxiliary Marker Hypothesis because Mandarin L2 learners do not tend to passivize core UAs more frequently than non-core ones in internally caused events irrespective of animacy types. Furthermore, they seem to passivize UEs when the verb argument is inanimate, which is not predicted by the Perfective Auxiliary Marker Hypothesis. As suggested by Hirakawa (2006), L2 learners might be sensitive to the semantic properties (telicity and agentivity), which underlie the gradience of intransitive verbs, rather than to auxiliary selection, which is only a diagnostic of split intransitivity in Romance and other Germanic languages.

The present study provides further support for the claim that telicity is a fundamental feature of UAs. Causation types only work on UAs but on UEs. UAs, especially core ones, typically denote verb of change of location and state. According to Yip (1995), L2 learners would assume that any change of state cannot happen without an external causer or an agent. Therefore, it is easier for them to conceptualize an agent or causer for core UAs which denote high degree of telic change. On the other hand, Levin and Rappaport Hovav (1995) assume that agentive verbs are always internally caused. Core UEs are agentive and volitional processes, whereas peripheral/non-core UEs are less agentive and volitional (Dowty, 1991; Van Valin,

1990). It seems that L2 learners do not conceptualize an agent for the event, for the verb itself denotes high agentivity. Therefore, causation types do not influence the overpassivization tendency of UEs but UAs, which is attributable to the different lexical properties between UAs and UEs.

The present study also sheds some light on the role of animacy on the overpassivization tendency of UAs and UEs. Since agentivity is a primary property of UEs, it is found that animacy types affect the overpassivization tendency of UEs to a greater extent than UAs. Animacy types also have a greater effect on core UEs than on non-core ones. L2 learners might treat UAs as passives first, and they tend to extend the passive morphology to UAs with both animate and inanimate subjects. As proficiency increases, they stop passivizing UAs whether the subject is animate or inanimate, since a theme does not require an animate argument. L2 learners have no problems with UEs when the subject is animate since an agent typically asks for an animate entity; however, when the subject is inanimate, they tend to passivize UEs since inanimate arguments do not function as a typical agent. Since core UEs are more agentive than non-core ones, it is observed that core UEs are more likely to be passivized than non-core ones. The findings are in line with the study of Vernice and Sorace (2018), which suggest that animacy types affect the processing of UEs, especially core UEs. The present study also provides further evidence for the claim that the choice of passive voice is influenced by both verb types and animacy (Croft, 1995; Ferreira, 1994; Swart, et al, 2008).

5.2.3 Implications for L2 Acquisition

Numerous studies on L2 acquisition have always focused on investigating to what extent

L2 knowledge is constrained by some universal and probably innate linguistic knowledge and to what extent this linguistic knowledge is mediated by the learners' L1. It is widely assumed that the linguistic knowledge of L2 learners differs from the linguistic competence of native speakers. But they are faced with a similar logical problem of acquisition. In child acquisition, researchers need to answer how L1 acquirers could attain the subtle and abstract knowledge that go beyond the input they receive as a child. In L2 acquisition, it is also necessary to find out how L2 learners could acquire some abstract and subtle properties of grammar that are underdetermined in L2 input. UG is motivated on the ground of the logical problem of acquisition (White, 2003). If it turns out that L2 learners could attain some abstract and subtle knowledge that are neither induced from L2 input nor from L1 transfer, it could indicate that this knowledge comes from UG, suggesting that UG constrains the interlanguage grammars of L2 learners.

The findings in the present study provides further evidence for the constraints of UG on interlanguage grammars. That is, the results suggest that the L2 acquisition of split intransitivity is lexically constrained, and that the developmental pattern of the syntax of the split intransitivity is conditioned by the SIH. The present findings present further evidence for direct access to semantic universals when the core-peripheral distinction cannot be accounted for by either L1 transfer or L2 input alone.

Although the UA-UE distinction is universal, different languages encode the distinction in different language-specific syntactic diagnostics. The Mandarin counterparts of PPPs and the *for hours* construction do not serve as diagnostics of split intransitivity in Mandarin. Mandarin, like English, does not have overt morphological markers for the UA-UE distinction.

Furthermore, the distinction is never taught in the classroom. According to the Full Transfer/Full Access Hypothesis (Schwartz & Sprouse, 1994, 1996), L1 serves as the initial state of L2 acquisition. Intermediate Mandarin L2 learners tend to incorrectly accept PPPs with UEs because of L1 transfer. However, non-native like trends on the judgments of PPPs can also logically be explained by the Full Transfer Hypothesis. The present study provides further support for the role of UG and L1 transfer in L2 acquisition.

5.3 Future Work

The dissertation looked at the plausibility of the SIH and its role in L2 acquisition of PPPs and the *for hours* constructions, and examined the role of the SIH in influencing the overpassivization tendency of intransitive verbs. The present study suggests that the SIH seems to be cross-linguistically universal in capturing the gradience of intransitive verbs and the developmental path of the syntax of split intransitivity is lexically constrained. Mandarin L2 learners also have difficulties in acquiring PPPs and the *for hours* construction for the sake of L1 transfer. Depending on causation types and animacy types, L2 learners tend to have different rates of error production on UAs and UEs. However, there are still some points that need further research in the future.

First of all, there should be more diagnostics of split intransitivity to be examined in future studies. Baker (2018) has demonstrated that there is a correlation found between the SIH and verb classes identified by diagnostics of English split intransitivity. In his study, more than ten diagnostics were investigated and he suggests that native speakers of English are sensitive to the SIH. However, the present study only tested whether L2 learners rely on the semantic

evidence in acquiring two diagnostics of split intransitivity, namely, PPPs and the *for hours* constructions. More research should be done to examine if the acquisition of other diagnostics is also lexically constrained by the SIH.

Secondly, there is still a need to investigate other L2 learners of English from different L1 backgrounds in the future. According to the Full Transfer/Full Access Hypothesis, L1 grammar is assumed to be the initial state of L2 acquisition (Schwartz & Sprouse, 1994, 1996). L2 learners are claimed to start out with grammatical representations derived from the L1 grammar. Mandarin-speaking L2 learners of English in the present study are found to be influenced by their L1 and they tend to accept UEs in PPPs because both UAs and UEs are compatible with the Mandarin counterpart of English PPPs. If PPPs in other languages serve as a diagnostic of split intransitivity like English, it could be predicted that it will not cause much problem to L2 learners.

Finally, there could be more future works on the online processing of split intransitivity. The present study offers further support for the plausibility of the SIH through offline acceptability judgment tests. Previous studies on the SIH in auxiliary-selecting languages also provide evidence for the psychological reality of the core-peripheral distinction in L2 acquisition of auxiliary selection. The SIH is found to have a role to play in English split intransitivity, so it could be predicted that the core-peripheral distinction should also be displayed in real-time processing of English split intransitivity. For example, a violation of telicity expectations with core UAs might result in higher processing costs for the sentence (longer reading times) than with non-core ones. A violation of animacy expectations with core UEs could result in higher processing costs for the sentence (longer reading times) than non-

core ones. Therefore, more research on online processing is needed to examine the psychological reality of the SIH in English split intransitivity.

References

Ackema, P., & Sorace, A. (2017). Auxiliary selection. In M. Everaert and H. van Riemsdijk (Eds.), 1-32. *The Wiley Blackwell Companion to Syntax* (2nd ed.). Hoboken: Wiley-Blackwell.

Alexiadou, A., Anagnostopoulou, E., & Everaert, M. (Eds.) (2004). *The unaccusativity puzzle: Explorations of the syntax-lexicon interface*. Oxford: Oxford University Press.

Baker, M. (1988). *Incorporation: A theory of grammatical function changing*. Chicago: University of Chicago Press.

Baker, M. (1997). Thematic roles and syntactic structure. In L. Haegeman (Ed.), *Elements of grammar: handbook in generative syntax*, 73–137. Dordrecht: Kluwer.

Baker, J. (2018). Split intransitivity in English. *English Language & Linguistics*, *23*(3), 557-589.

Balcom, P. (1997). Why is this happened? Passive morphology and unaccusativity. *Second Language Research*, *13*(1), 1-9.

Bard, E.G., Frenck-Mestre, C. & Sorace, A. 2010. Processing auxiliary selection with Italian intransitive verbs, *Linguistics*, *48*(2), 325-362.

Belletti, A., & Rizzi, L. (1981). The syntax of "ne": Some theoretical implications. *The Linguistic Review, 1*(2), 117-154.

Bley-Vroman, R. (1990). The logical problem of foreign language learning. *Linguistic Analysis 20*, 3-49.

Bley-Vroman, R. (2009). The evolving context of the fundamental difference hypothesis. *Studies in Second Language Acquisition*, *31*(2), 175-198.

Bock, J. k., & Warren, R.K. (1985). Conceptual accessibility and syntactic structure in sentence formulation. *Cognition, 21*, 47-67.

Bock, K. J., & Loebell, H. (1990). Framing sentences. *Cognition*, *35*, 1-39.

Borer, H. (2005). *The normal course of events* (Vol. 2). Oxford: Oxford University Press.

Bowerman, M. (1983). How do children avoid constructing an overly general grammar in the absence of feedback about what is not a sentence? *Papers and Reports on Child*

Language Development, 22, 23-35. Stanford University.

Burzio, L. (1986). *Italian syntax: A Government-Binding approach*. Dordrecht: Reidel.

Carnie, A. (2013). Syntax: A generative introduction (3rd ed.). Hoboken: Wiley-Blackwell.

Cennamo, M. & Sorace, A. (2007). *Unaccusativity at the syntax-lexicon interface: Evidence from Paduan*. In R. Aranovich (Ed.) S*plit auxiliary systems. A crosslinguistic perspective,* 65-100. Amsterdam: John Benjamins.

Chomsky, N. (1981). *Lectures on government and binding*. Dordrecht: Foris.

Chung, T. (2014). Multiple factors in the L2 acquisition of English unaccusative verbs. *International Review of Applied Linguistics in Language Teaching*, *52*(1), 59-87.

Comrie, B. (1989). *Language universals and linguistic typology*. Chicago: University of Chicago Press.

Cook, V., & Newson, M. (1996). *Chomsky's Universal Grammar: An introduction*. Oxford: Blackwell.

Croft, W. (1995). Modern syntactic typology. In M. Shibatani & T. Bynon (Eds.), *Approaches to language typology,* 85–144. New York: Clarendon Press.

De Swart, P., Lamers, M., & Lestrade, S. (2008). Animacy, argument structure, and argument encoding. *Lingua*, *118*(2), 131-140.

Dowty, D. (1991). Thematic proto-roles and argument selection. *Language*, *67*, 547–619.

Fang, Y. Q. (2008). *An introduction to Chinese grammar*. Beijing: Beijing Language University Press.

Ferreira, F. (1994). Choice of passive voice is affected by verb type and animacy. *Journal of Memory and Language*, *33*(6), 715-736.

Ferretti, T., McRae, K., & Hatherell, A. (2001). Integrating verbs, situation schemas, and thematic role concepts. *Journal of Memory and Language, 44*(4)*,* 516-547.

Fillmore, C. (1968). The case for case. In E. Bach & R. Harms (Eds.), *Universals in linguistic Theory,* 1-90. New York: Holt, Reinhart & Winston.

Grimshaw, J. (1990). *Argument structure*. Cambridge, MA: MIT Press.

Haegeman, L. (1994). *Introduction to Government and Binding theory* (2nd ed.). Oxford: Blackwell.

Hale, K. (1996). Can UG and the L1 be distinguished in L2 acquisition? *Brain and Behavioral Sciences*, *19*, 728–30.

Hirakawa, M. (1999). L2 acquisition of Japanese unaccusative verbs by speakers of English and Chinese. In K. Kanno (Ed.), *The acquisition of Japanese as a second language*, 89–113. Amsterdam: Benjamins.

Hirakawa, M. (2001). L2 acquisition of Japanese unaccusative verbs. *Studies in Second Language Acquisition*, *23*(2), 221-245.

Hirakawa, M. (2003). Unaccusativity in second language Japanese and English. Tokyo: Hituji Syobo.

Hirakawa, M. (2006). 'Passive' unaccusative errors in L2 English revisited. In R. Slabakova, S. Montrul & P. Prévost (Eds.), *Inquiries in linguistic development: In honor of Lydia White*, 17-39. Amsterdam: John Benjamins.

Hubbard, P. L. (1994). Nontransformational theories of grammar: Implications for language teaching. In T. Odlin (Ed.), *Perspectives on pedagogical grammar*, 49–71. New York: Cambridge University Press.

Ionin, T., & Zyzik, E. (2014). Judgment and interpretation tasks in second language research. *Annual Review of Applied Linguistics*, *34*, 37-64.

Jackendoff, R. (1990). *Semantic structures*. Cambridge, MA: MIT Press.

Ju, M. K. (1997). *Overpassivization errors of Korean second language learners of English*. Paper presented at the Second Language Research Forum, East Lansing, MI.

Ju, M. K. 2000. Overpassivization errors by second language learners. *Studies in Second Language Acquisition*, *22*, 85–111.

Juffs, A. (1998). The acquisition of semantics–syntax correspondences and verb frequencies in ESL materials. *Language Teaching Research, 2*, 93–123.

Juffs, A. (2001). Discussion: Verb classes, event structure, and second language learners' knowledge of semantics-syntax correspondences. *Studies in Second Language Acquisition*, *23*(2), 305-313.

Kageyama, T. (1993). *Bunpo to gokeisei* [Grammar and word formation]. Tokyo: Hitujishobo.

Kageyama, T. (1996). *Doushi-imiron* [Verb semantics]. Tokyo: Kuroshio.

Keenan, E. L., & Comrie, B. (1977). Noun phrase accessibility and universal grammar. *Linguistic Inquiry*, *8*, 63-99.

Keller, F., & Sorace, A. (2003). Gradient auxiliary selection and impersonal passivization in German: An experimental investigation. *Journal of Linguistics*, *39*, 57-108.

Kellerman, E. (1979). Transfer and nontransfer: Where we are now. *Studies in Second Language Acquisition*, *2*, 37–57.

Keyser, S. J., & Roeper, T. (1984). On the middle and ergative constructions in English. *Linguistic Inquiry, 15*(3), 381–416.

Kondo, T. (2005). Overpassivization in second language acquisition. *International Review of Applied Linguistics in Language Teaching, 43*, 129–161.

Laws, J., & Yuan, B. P. (2010). Is the core-peripheral distinction for unaccusative verbs cross-linguistically consistent?: Empirical evidence from Mandarin. *Mandarin Language and Discourse*, *1*(2), 220-263.

Levin, B., & Rappaport Hovav, M. (1986). The formation of adjectival passives. *Linguistic Inqui*ry, *17*(4), 623–61.

Levin, B., & Rappaport Hovav, M. (1995). *Unaccusativity: At the syntax-lexical semantics interface*. Cambridge, MA: MIT Press.

Marantz, A. (2013). Verbal argument structure: Events and participants. *Lingua*, 130, 152–68.

Massam, D. (1990). Cognate objects as thematic objects. *Canadian Journal of Linguistics*, 35(2), 161–90.

Miyagawa, S. (1989). *Structure and case marking in Japanese*. New York: Academic Press.

Montrul, S. (2001). Agentive verbs of manner of motion in Spanish and English as second languages. *Studies in Second Language Acquisition*, *23*(2), 171-206.

Montrul, S. (2004). Psycholinguistic evidence for split intransitivity in Spanish second language acquisition. *Applied Psycholinguistics*, *25*, 239-267.

Oshita, H. (1997). The Unaccusative trap: L2 acquisition of English intransitive verbs [Unpublished doctoral dissertation]. University of Southern California.

Oshita, H. (2000). What is happened may not be what appears to be happening: A corpus study of 'passive' unaccusatives in L2 English. *Second Language Research*, *16*, 293-324.

Oshita, H. (2001). The unaccusative trap in second language acquisition. *Studies in Second Language Acquisition*, *23*(2), 279-304.

Pae, H. K., Schanding, B., Kwon, Y. J., & Lee, Y. W. (2014). Animacy effect and language specificity: Judgment of unaccusative verbs by Korean learners of English as a foreign language. *Journal of Psycholinguistic Research*, *43*(2), 187-207.

Perlmutter, D. (1978). Impersonal passives and the Unaccusative Hypothesis. *Berkeley Linguistic Society*, *4*, 157–189.

Pinker, S. (1984). *Language learnability and language development*. Cambridge, MA: Harvard University Press.

Pinker, S. (1989). *Learnability and cognition: the acquisition of argument structure*. Cambridge, MA: MIT Press.

Rappaport Hovav, M. (2019). Deconstructing internal causation. https://www.researchgate.net/profile/Malka_Hovav/publication/335392011.

Rappaport Hovav, M., & Levin, B. (1998). Building verb meanings. In M. Butt & W. Heuder (Eds). *The projection of arguments: Lexical and compositional factors*, 97-134. Standford: CSLIP Publications.

Roehm, D., Sorace, A. & Bornkessel-Schlesewsky, I. (2013). Processing flexible form-to meaning mappings: Evidence for enriched composition as opposed to indeterminacy. *Language and Cognitive Processes*, *28*(8), 1244-1274.

Rothman, J., & Slabakova, R. (2018). The generative approach to SLA and its place in modern second language studies. *Studies in Second Language Acquisition*, *40*(2), 417-442.

Rothstein, S. (2008). *Structuring events: A study in the semantics of lexical aspect*. John Wiley & Sons.

Schoorlemmer, M. (2004). Syntactic unaccusativity in Russian. In Alexiadou, A., Anagnostopoulou, E., & Everaert, M. (Eds.), *The unaccusativity puzzle: Explorations of the syntax-lexicon interface*, 207-242. Oxford: Oxford University Press.

Schwartz, B. D., & Sprouse, R. (1994). Word order and nominative case in nonnative language acquisition: a longitudinal study of (L1 Turkish) German interlanguage. In T. Hoekstra and B. D. Schwartz (Eds.), *Language acquisition studies in generative grammar*, 317–

368. Amsterdam: John Benjamins.

Schwartz, B. D., & Sprouse, R. (1996). L2 cognitive states and the full transfer/full access model. *Second Language Research*, *12*, 40–72.

Schwartz, B. D., & Sprouse, R. (2000a). The use and abuse of linguistic theory in L2 acquisition research. In A. Juffs, T. Talpas, G. Mizera and B. Burtt (Eds.), *Proceedings of GASLA IV*, 176–187. University of Pittsburgh Working Papers in Linguistics.

Schwartz, B. D., & R. Sprouse. (2000b). When syntactic theories evolve: consequences for L2 acquisition research. In J. Archibald (Eds.), *Second language acquisition and linguistic theory*, 156–186. Oxford: Blackwell.

Schwartz, B. D., & Sprouse, R. (2013). Generative approaches and the poverty of the stimulus. In J. Herschensohn & M. Young-Scholten (Eds.), *The Cambridge handbook of second language acquisition*,137–158. Cambridge, UK: Cambridge University Press.

Shibatani, M. (1985). Passives and related constructions: A prototype analysis. *Language*, *61*, 821–848.

Smith, C. S. (1997). *The parameter of aspect* (2nd ed.). Dordrecht: Kluwer Academic Publishers.

Sorace, A. (1993a). Incomplete versus divergent representations of unaccusative grammars of Italian. *Second Language Research*, *9*, 22–47.

Sorace, A. (1993b). Unaccusativity and auxiliary choice in non-native grammars of Italian and French: Asymmetries and predictable indeterminacy. *Journal of French Language Studies*, *3*, 71–93.

Sorace, A. (1995). Acquiring linking rules and argument structures in a second language: The unaccusative/unergative distinction. In L. Eubank, L. Selinker, & M. Sharwood Smith (Eds.), *The current state of interlanguage*, 153–175. Amsterdam: Benjamins.

Sorace, A. (1996). The use of acceptability judgements in second language acquisition research. In V.T. Bhatia & W. Ritche (Eds.), *Handbook of language acquisition*, 375–409. New York: Academic Press.

Sorace, A. (2000). Gradients in auxiliary selection with intransitive verbs. *Language*, *76*, 859-890.

Sorace, A. (2004). Gradience at the lexicon-syntax interface: evidence from auxiliary selection. In A. Alexiadou, M. Everaert, & E. Anagnostopoulou (Eds.), *The Unaccusativity puzzle: Explorations of the syntax-lexicon interface*, 243-268. Oxford: Oxford University Press.

Sorace, A. (2011). Gradience in split intransitivity: the end of the unaccusative hypothesis. *Archivio Glottologico Italiano*, *96,* 67-86.

Sorace, A., & Shomura, Y. (2001). Lexical constraints on the acquisition of split intransitivity: Evidence from L2 Japanese. *Studies in Second Language Acquisition*, *23*(2), 247-278.

Tenny, C. L. (1987). *Grammaticalizing aspect and affectedness* (Unpublished doctoral dissertation). Massachusetts Institute of Technology.

Tenny, C. (1994). *Aspectual roles and the syntax-semantics interface*. Dordrecht: Kluwer.

Tomlin, R. S. (1983). On the interaction of syntactic subject, thematic information, and agent in English. *Journal of Pragmatics*, *7*, 411–432.

Trueswell, J., Tanenhaus, M., & Garnsey, S. (1994). Semantic influences on parsing: Use of thematic role information in syntactic ambiguity resolution. *Journal of Memory and Language, 33*, 285–318.

Washio, R. (2001). Auxiliary selection: A universal phenomenon. *Linguistics and Interdisciplinary Research*, 139-167.

Weckerly, J., & Kutas, M. (1999). An electrophysiological analysis of animacy effects in the processing of object relative sentences. *Psychophysiology*, *36*, 559–570.

White, L. (1989). *Universal grammar and second language acquisition*. Amsterdam: John Benjamins.

White, L. (2003). Second language acquisition and universal grammar. Cambridge: Cambridge University Press.

Yip, V. (1990). Interlanguage ergative constructions and learnability. *CUHK papers in linguistics* (Vol.2*)*, 45–68. Hong Kong, Chinese University.

Yip, V. (1995). Interlanguage and learnability. *From Chinese to English. Amsterdam: Benjamins*.

Yuan, B. P. (1999). Acquiring the unaccusative/unergative distinction in a second language: Evidence from English-speaking learners of L2 Mandarin. *Linguistics*, *37*, 275-296.

Yusa, N. (2003). Passive unaccusatives in L2 acquisition. *Japanese/Korean Linguistics*, *11*, 246-259.

Van Hout, A. (2004). Telicity Checking. In Alexiadou, A., Anagnostopoulou, E., & Everaert, M. (Eds.), *The unaccusativity puzzle: Explorations of the syntax-lexicon interface*, 60-83. Oxford: Oxford University Press.

Van Valin, R. D. (1990). Semantic parameters of split intransitivity. *Language*, *66*, 221–260.

Vernice, M., & Sorace, A. (2018). Animacy effects on the processing of intransitive verbs: an eye-tracking study. *Language, Cognition and Neuroscience*, *33*(7), 850-866.

Zaenen, A. (1993). Unaccusativity in Dutch: Integrating syntax and lexical semantics. In J. Pustejovsky (Ed.), *Semantics and the lexicon*, 129–161. Dordrecht: Kluwer.

Zobl, H. (1989). Canonical typological structures and ergativity in English L2 acquisition. In S. M. Gass, & J. Schachter (Eds.), *Linguistic perspectives on second language acquisition*, 203–221. New York: Cambridge University Press.

Appendixes

Appendix A

1. The arrived guest was in the garden.
2. The bus arrived for hours at the station.
3. The bus arrived at the station.
4. The stayed guest was in the garden.
5. The bus stayed for hours at the station.
6. The bus stayed at the station.
7. The decayed wooden table was thrown away.
8. A wooden table decayed for years in the corner.
9. A wooden table decayed in the corner.
10. The stood wooden table was thrown away.
11. A wooden table stood for years in the corner.
12. A wooden table stood in the corner.
13. The departed train was late for hours due to a typhoon.
14. The train departed late for hours from the station.
15. The train departed late from the station.
16. The seemed train was late for hours due to a typhoon.
17. The train seemed late for hours to the station.
18. The train seemed late to the station.
19. The vanished card was on the floor.
20. Three men vanished for minutes from the room.
21. Three men vanished from the room.
22. The remained card was on the floor.
23. Three men remained for minutes in the room.
24. Three men remained in the room.
25. The escaped monster was in Scotland.

26. Poisonous gas escaped for years from the district.
27. Poisonous gas escaped from the district.
28. The existed monster was in Scotland.
29. Poisonous gas existed for years in the district.
30. Poisonous gas existed in the district.
31. The appeared trend was strange.
32. A new trend appeared for months in the country.
33. A new trend appeared in the country.
34. The continued trend was strange.
35. The new trend continued for months in the country.
36. The new trend continued in the country.
37. The arisen food shortage was wide spreading.
38. A food shortage arose for months in the country.
39. A food shortage arose in the country.
40. The persisted food shortage was wide spreading.
41. The food shortage persisted for months in the country.
42. The food shortage persisted in the country.
43. The fallen picture was dirty on the floor.
44. A picture fell for minutes on the floor.
45. A picture fell on the floor.
46. The sat picture was dirty on the floor.
47. A picture sat for minutes on the floor.
48. A picture sat on the floor.
49. The worked woman was the manager of the company.
50. The workers worked for hours on the icy road.
51. The workers worked on the icy road.
52. The slid woman was the manager of the company.
53. The workers slid for minutes on the icy road.
54. The workers slid on the icy road.

55. The traveled sports car is fast.
56. The sports car traveled for hours at high speed.
57. The sports car traveled at high speed.
58. The spun car tire is fast.
59. The car tires spun for hours at high speed.
60. The car tires spun at high speed.
61. The sung boy was punished by the teacher.
62. In the contest, the boy sang for three minutes on the stage.
63. In the contest, the boy sang on the stage.
64. The run boy was punished by the teacher.
65. In the contest, the boy ran for three minutes on the track.
66. In the contest, the boy ran on the track.
67. The cried girl was hungry.
68. The girl cried for minutes in front of the crowd.
69. The girl cried in front of the crowd.
70. The trembled girl was hungry.
71. The girl trembled for minutes in front of the crowd.
72. The girl trembled in front of the crowd.
73. The chatted beggar was homeless.
74. The beggar chatted for hours outside the theater.
75. The beggar chatted outside the theater.
76. The danced beggar was homeless.
77. The beggar danced for hours outside the theater.
78. The beggar danced outside the theater.
79. The waited fans were outside Messi's hotel.
80. Some football fans waited for hours near Messi's hotel.
81. Some football fans waited near Messi's hotel.
82. The walked fans were outside Messi's hotel.
83. Some football fans walked for hours near Messi’s hotel.

84. Some football fans walked by Messi's hotel.
85. The played children were punished by their parents.
86. Some children played for hours in the river.
87. Some children played in the river.
88. The swum children were punished by their parents.
89. Some children swam for hours in the river.
90. Some children swam in the river.
91. The shouted boy was punished in the classroom.
92. The little boy shouted for a few minutes on the sofa.
93. The little boy shouted on the sofa.
94. The jumped boy was punished in the classroom.
95. The little boy jumped for a few minutes on the sofa.
96. The little boy jumped on the sofa.

Appendix B

1. The soldiers were sent to the country at war. They (arrived/ were arrived) there next day.
2. My friend sent the letter by express mail yesterday. It (arrived/ was arrived) this morning.
3. The soldiers left for the country yesterday. They (arrived/ were arrived) there next day.
4. I was expecting a letter from my friend yesterday. It (arrived/ was arrived) this morning.
5. A big truck crashed into a car. The driver (died/was died) immediately.
6. A big truck crashed into a wall. The engine (died/ was died) immediately.
7. The man was very old. He (died/ was died) suddenly.
8. My car was very old. The engine (died/ was died) suddenly.
9. The boy lifted the dog out of the blanket. The dog (appeared/ was appeared) slowly.
10. The boy pulled the toy car out of the sand. It (appeared/ was appeared) slowly.
11. It was a very foggy morning. Some people (appeared/were appeared) slowly in the distance.
12. It was a very foggy morning. Some houses (appeared/ were appeared) slowly as we drove along.
13. The postman knocked on the door. A man (emerged/ was emerged) from the house.

14. The man went into the dark house. A light (emerged/ was emerged) from the window.
15. The forest was very dark. A man (emerged/ was emerged) from the darkness.
16. The harbor was dark at night. A light (emerged/ was emerged) suddenly from the darkness.
17. The snake ate the mouse in one bite. The mouse (disappeared/was disappeared) immediately.
18. The man ate spaghetti with great speed. His spaghetti (disappeared/was disappeared) immediately.
19. The man fell from the cliff and into the lake. He (disappeared/was disappeared) immediately.
20. The rock slid off the cliff and into the lake. The rock (disappeared/was disappeared) immediately.
21. The magician did a trick with a rabbit. The rabbit (vanished/ was vanished) instantly.
22. The magician did a trick with a coin. The coin (vanished/ was vanished) instantly.
23. A fish jumped in the water. The fish (vanished/ was vanished) instantly.
24. A coin fell into the water. The coin (vanished/was vanished) instantly.
25. The police warned the locals not to go out alone. Many people (stayed/were stayed) together.
26. Many companies wanted to buy land at the time. Land prices (stayed/were stayed) high for a short time.
27. It was dark outside. Many people (stayed/were stayed) at home.
28. Tokyo is a big city. Land prices (stayed/was stayed) high for a long time.
29. The door was locked suddenly. Three men still (remained/were remained) inside the room.
30. The light was turned off suddenly. The house (remained/was remained) dark for a while.
31. The man was sick. He (remained/was remained) in the hospital for three days.
32. The book was on the table. It (remained/was remained) there for days.
33. My younger brother was told not to jump on the sofa. He (sat/was sat) down immediately.
34. The old house was rebuilt recently. It (sat /was sat) at the end of the street for years.
35. My younger brother was upset. He (sat/was sat) on the sofa quietly for one hour.
36. The house was old. It (sat/was sat) at the end of the street for years.

37. Human beings rely on oxygen and water. They only (exist/are existed) on the earth.

38. Feminist fought for equality in the job market. Gradually, gender differences no longer (existed/were existed).

39. Pandas are cute. They only (exist/are existed) in China.

40. The job market was fair. Gender differences no longer (existed/were existed).

41. The boy was laughed at by his classmates. He (stood/was stood) up suddenly and left.

42. The government built a statue in the center of the square. It (stood/was stood) there for years.

43. The boy was alone. He (stood/was stood) up suddenly and left.

44. The statue in the center of the square was unique. It (stood/was stood) there for years.

45. The man was fired by his boss. He (seemed /was seemed) very upset.

46. The boy spilled his milk on the table. The table (seemed/was seemed) very dirty.

47. The man had a good time at the party. He (seemed/was seemed) very happy.

48. It was already 9 p.m. The train (seemed/was seemed) late for one four.

49. Many people smoked in the room. The woman (coughed/was coughed) terribly.

50. The driver tried to start the truck. The engine (coughed/was coughed) a few times, but wouldn't start.

51. The woman had a cold. She (coughed/was coughed) terribly.

52. The truck engine was old. It (coughed/was coughed) a few times, but wouldn't start.

53. The man was pushed into the river suddenly. He (trembled/was trembled) with cold.

54. The boy was asked to give a speech in public. His voice (trembled/was trembled) terribly.

55. The man came out of the water. He (trembled/was trembled) with cold.

56. The boy was nervous. His voice (trembled/was trembled) terribly.

57. Someone put a bunch of flowers in front of the boy. He (sneezed/was sneezed) loudly.

58. The pepper made him have a powerful sneeze. It (sneezed / was sneezed) the germs out of his nose.

59. The boy had a cold. He (sneezed/was sneezed) a lot.

60. He sneezed a powerful sneeze. It (sneezed / was sneezed) the germs out of his nose.

61. The mother hummed a song. The baby (slept/was slept) soon.

62. The government issued a curfew. The city (slept/was slept) peacefully.
63. The baby was tired. He (slept/was slept) soon.
64. It was late at night. The city (slept/was slept) peacefully.
65. The policeman went after the thief. The thief (ran/was run) fast.
66. The man was attacked. Blood (ran/was run) down his face slowly.
67. The man was an athlete. He (ran/was run) fast.
68. The man lost consciousness. Blood (ran/was run) down his face slowly.
69. The alligator was following the woman. She (swam/was swum) fast.
70. The man was punched in the head. The room (swam/was swum) suddenly before his eyes.
71. The girl was a swimmer. She (swam/was swum) fast.
72. The boy was dizzy. The room (swam/was swum) suddenly before his eyes.
73. A new toy car was sent to my younger brother. He (played/was played) with it all day.
74. The boy was so nervous on the stage. The piano (played/was played) out of tune several times.
75. My younger brother was two years old. He (played/was played) with the new toy car all day.
76. I was looking forward to the piano part. But it (played/was played) out of tune several times.
77. The writer had to take care of her six- month-old baby. She (worked/was worked) at home.
78. The doctor told the woman to take the medicine. It (worked/was worked) immediately.
79. The woman was a writer. She (worked/was worked) at home.
80. The medicine was effective. It (worked/was worked) immediately.
81. The girl was invited to perform for the president. She (sang/was sung) beautifully.
82. The drug dealer shot at him. The bullets (sang/was sung) past his ears.
83. The girl was 11 years old. She (sang/was sung) beautifully.
84. It was dark in the forest. Bullets (sang/were sung) past the soldier’s ears.
85. The clown did some funny tricks. My brother (laughed/was laughed) loudly.
86. The rain filled the river in the forest. It (laughed/was laughed) loudly and clearly.
87. My brother was happy. He (laughed/was laughed) loudly.
88. I found a beautiful river in the forest. It (laughed/was laughed) loudly and clearly.

89. The boy was hit by his brother. He (cried/was cried) immediately.

90. He played the sad song on his guitar. It (cried/was cried) beautifully in time with the music.

91. The boy lost his favorite toy. He (cried/was cried) immediately.

92. I heard the sound of a guitar. It (cried/was cried) beautifully in time with the music.

93. The boys were too noisy in the class. The teacher (shouted/was shouted) at them loudly.

94. The TV host kept criticizing women for not being smart. A voice from the audience (shouted/was shouted) angrily.

95. The boy was in a bad mood. He (shouted/was shouted) at me suddenly.

96. Everyone listened to the teacher. A voice (shouted/was shouted) suddenly.

Errata

Errors	Corrections
p. 17, (5a) velocemnet	velocemente
p. 30, l. 11 Leaners	Learners
p. 44, l.10 Typologically, different languages	Typologically different languages
p. 48, l.4 difficultly	difficulty
p.140, l.15 erros	errors
p.157, l.10 (15a)	(43a)